Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

A1 Ag84m c3

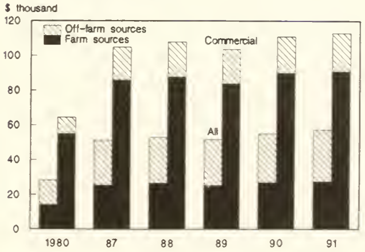
United States
Department of
Agriculture

Office of
Public Affairs

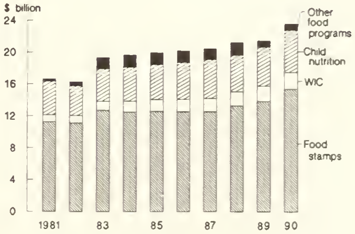
Miscellaneous
Publication
Number 1063

1990 Fact Book of Agriculture

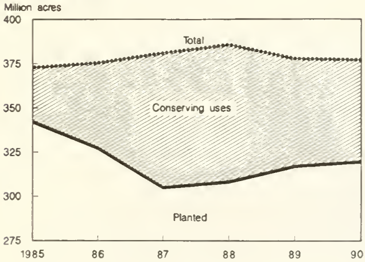
Net cash income per farm



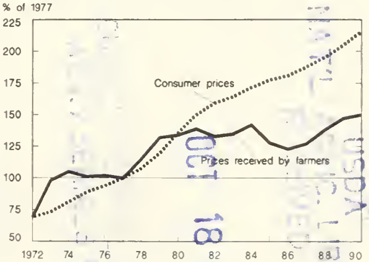
USDA costs for food assistance



U.S. crop acreage planted and placed in conserving uses



Consumer prices and prices received by farmers



USDA
NAT'L AGRIC. LIBRARY
RECEIVED
OCT 18 '93

1990 FACT BOOK OF AGRICULTURE

Office of Public Affairs

Miscellaneous Publication No. 1063

United States Department of Agriculture

Revised April 1991

PREFACE

The 1990 FACT BOOK OF AGRICULTURE is intended as a resource of information for reporters, editorial writers, farm organization leaders, agribusiness managers, students, and others who study, speak, and write about agriculture.

The contents of this book are organized to reflect the structure of modern U.S. agriculture and provide information on its recent history, especially as it pertains to statistics gathered this century. The major subdivisions are the following:

I. THE U.S. FOOD AND FIBER SECTOR deals with costs of food, food services and distribution, food expenditures and prices, the farm-to-retail price spread, and per capita food consumption.

II. FARM PRODUCTION, INCOME, AND VALUES deals with the various inputs for agriculture, and discusses them in more detail in separate chapters on land, water, farm labor, and farm machinery. It also talks about farm expenses, fertilizer, livestock and poultry feed, agricultural credit for housing and electricity and other items, farm production adjustment and income and price support programs for farmers, the grain reserve program, and livestock emergency feed. It also includes a new chapter showing the importance of the honeybees' input to the economy.

III. THE FARMING OPERATION covers the farm business itself in various terms, describing the farming region, how farms and lands are divided, farms by sales classes, family-controlled farming, land tenure and farm ownership, contract farming and vertical integration, and the rise of U.S. production.

IV. GLOBAL AGRICULTURE gives a snapshot of international trade matters, such as the GATT, as they affect U.S. farmers, USDA's export market services, future markets abroad for world trade expansion, U.S. responses to world hunger, the balance of international payments, and how U.S. agricultural production compares with that of other countries.

V. RURAL DEVELOPMENT pertains to the rural population and social problems of smaller towns and the open country.

VI. PROTECTING THE ENVIRONMENT: SOIL, WATER, PLANTS, BIRDS, ANIMALS mainly deals with activities of the U.S. Department of Agriculture and other Government and private agencies that regulate the protection of soil and water and help save food and fiber from pests. This section includes a new chapter emphasizing USDA efforts to enhance the Nation's water quality. USDA agencies also protect livestock and certain animals cared for by humans under certain specified conditions.

VII. FOOD MARKETING, PROTECTION, AND DISTRIBUTION describes the competitive system that converts farm commodities into safe consumer products ready for use commercially and for charity in homes, restaurants, and institutions, including local social welfare organizations and groups of American Indians and Alaska Natives. The system handles products from farmer to consumer as well as consumer education, advertising, and other elements of marketing.

VIII. RESEARCH AND EDUCATION tells about USDA's scientific agricultural research, information sources such as the National Agricultural Library, and small-scale agriculture activities, and has a chapter on biotechnology.

More detailed tabulations will be found in AGRICULTURAL STATISTICS, revised yearly. AGRICULTURAL STATISTICS is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Other selected references are listed on page 159.

Another annual source of information about agriculture is the YEARBOOK OF AGRICULTURE. Individual copies usually are available from U.S. Members of Congress. Copies otherwise are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, including back issues.

THE FACT BOOK OF U.S. AGRICULTURE is a publication of the Office of Public Affairs, U.S. Department of Agriculture, Washington, DC 20250.

A great deal of thanks goes to George Holcomb, the editor of the 1990 Fact Book of Agriculture. His meticulous coordination of the wide variety of materials is deeply appreciated.

Kelly M. Shipp,
Director of Public Affairs and Press Secretary

Eligibility for participation in all programs administered by the U.S. Department of Agriculture is established by law without regard to race, color, national origin, sex, age, mental or physical handicap, or religion. If you feel you have been denied the benefits of any USDA program on any of these grounds, write directly to the Secretary of Agriculture, Washington, DC 20250.

CONTENTS

PREFACE ii

INTRODUCTION 1

I. THE U.S. FOOD AND FIBER SECTOR 6
  1. Cost of Food Services and Distribution 6
  2. Food Expenditures and Prices 6
  3. Farm-Retail Price Spread 8
  4. Per Capita Food Consumption 8

II. FARM PRODUCTION, INCOME, AND VALUES 10
  5. Inputs for Agriculture 10
  6. Land 10
  7. Water 11
  8. Farm Labor 12
  9. Farm Machinery 13
  10. Farm Expenses 14
  11. Fertilizer 19
  12. Livestock and Poultry Feed 19
  13. Agricultural Credit 21
  14. The Balance Sheet 28
  15. Farm Income 29
  16. Farm Production Adjustments 32
  17. Income and Price Support Programs 34
  18. Grain Reserve Program 35
  19. Emergency Livestock Feed 35
  20. Bees and Honey 36

III. THE FARMING OPERATION 38
  21. Farming Regions 38
  22. Farms and Land in Farms 39
  23. Farms by Sales Classes 39
  24. Family-Controlled Farming 42
  25. Land Tenure 43
  26. Farmland Ownership 44
  27. Contract Farming and Vertical Integration 45
  28. Rise of U.S. Production 46

IV. GLOBAL AGRICULTURE 48
  29. Foreign Trade (Exports) 48
  30. Trade Blocs 49
  31. Export Expansion Activities 51
  32. Future Markets Abroad for World Trade Expansion 53
  33. U.S. Response to World Hunger 56

34. Foreign Trade (Imports) ... 56
35. Balance of Payments ... 56
36. Comparing Other Countries With This One ... 57

V. RURAL DEVELOPMENT ... 60
37. Rural Population ... 60
38. Age and Race ... 60
39. Nonmetropolitan Employment ... 61
40. Rural Income and Poverty ... 62
41. Local Governments ... 63
42. Federal Funding for Rural Area Development ... 65
43. Recreation ... 65
44. Rural Public Services ... 66

VI. PROTECTING THE ENVIRONMENT: SOIL, WATER, PLANTS, BIRDS, ANIMALS ... 68
45. Soil and Water Conservation ... 68
46. Conservation Programs Under the 1985 and 1990 Farm Bills ... 69
47. Enhancing the Nation's Water Quality ... 72
48. Great Plains Conservation Program ... 74
49. Other USDA Conservation and Water Quality Programs ... 74
50. Forest Management ... 76
51. Protection and Quarantine ... 81
52. Pesticides and Integrated Pest Management ... 83
53. Animal Damage Control ... 88
54. Veterinary Services ... 89
55. Animal Care ... 90

VII. FOOD PROTECTION, MARKETING, AND DISTRIBUTION ... 92
56. Meat and Poultry Inspection ... 92
57. Egg Products Inspection ... 93
58. Food Purchase Programs ... 93
59. Food Assistance Programs ... 94
60. Marketing Improvement ... 96
61. Research and Promotion Programs ... 97
62. Marketing Orders ... 98
63. Agricultural Transportation ... 99
64. Market Regulatory Laws ... 100
65. Market News ... 101
66. Federal Grading Programs ... 102
67. Federal Grain Inspection ... 103
68. Meat, Poultry, and Livestock Marketing Regulations ... 104
69. Farmer Cooperatives ... 104

VIII. RESEARCH AND EDUCATION ... 106
70. Agricultural Research ... 106
71. Global Change Research Initiative ... 111
72. Biotechnology ... 111
73. Future Agricultural Scientists ... 113

74. Human Nutrition Research and Education 114
75. National Agricultural Statistics 116
76. Agricultural Economics 116
77. Agricultural Information—The National Agricultural Library 117
78. Cooperative Extension System 118
79. Small-Scale Agriculture 120

APPENDIX I. USDA TABLES OF AGRICULTURAL INFORMATION ... 122
APPENDIX II. TABLES ON PROJECTS FOR WATER QUALITY ENHANCEMENT 142
APPENDIX III. METRIC CONVERSION CHART 147
APPENDIX IV. GLOSSARY 149
APPENDIX V. SELECTED REFERENCES 159
APPENDIX VI. USDA'S COMPUTERIZED INFORMATION SERVICE 166
APPENDIX VII. HOW TO GET INFORMATION FROM USDA 167

FIGURES

1. Consumer prices and prices received by farmers 3
2. What a dollar spent on food paid for in 1990 7
3. Farm debt 23
4. Who holds the farm debt 24
5. Net cash income per farm 30
6. Total world grain trade and U.S. share 48
7. Economic growth abroad 54
8. U.S. imports of red meat 57
9. World and U.S. economic growth 58
10. Nonmetro farming-dependent counties, 1986 64
11. U.S. crop acreage planted and placed in conserving uses 71
12. U.S. forest productivity trends: Softwood growth/inventory 77
13. U.S. forest productivity trends: Hardwood growth/inventory 78
14. Crop acres treated with pesticides 87
15. USDA costs for food assistance 95

TABLES

1. The amount of food a worker's hourly pay (before taxes) would buy 4
2. Farm value as a percentage of retail price for domestically produced foods, 1980 and 1990 9
3. U.S.land ownership and use in 1987 excluding Alaska 11
4. Non-Federal use of land in the United States, excluding Alaska, in 1987 11
5. Specified U.S. crops harvested by acres irrigated in 1987 12
6. Farm production expenses, 1969, 1974, 1979, 1982, 1987, and 1989 13
7. Indexes of total farm input and major input subgroups, United States, 1920-89 15
8. Kinds and quantities of feed consumed by livestock and poultry, feeding years 1965-66 and 1989-90 20
9. Farm debts, 1950, 1960, 1970, 1980, and 1983-89 22
10. Farmers' assets, debts, and equity, 1940, 1960, 1970, 1980, 1985, and 1989 29
11. Income from farming, 1989 30
12. States ranked by cash receipts (including net Commodity Credit Corporation loans), 1989 40
13. Number of farms and land in farms, United States, June 1, 1981-90 42
14. Percent of farms, land in farms, and average size, by sales class, United States, June 1, 1989-90 42
15. Agricultural productivity 47
16. Unemployment rates among various metro and nonmetro groups 50
17. Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, for all ownerships and regions, 1952-87 (1977=100) 79
18. U.S.rural population, 1950, 1960, 1970, 1980, 1986, 1988, and 1990 123
19. U.S.agriculture's capacity to produce, 1951, 1956, 1961, 1966, and 1971-89 124
20. Agricultural prices, farm incomes, assets, and exports, 1951, 1956, 1961, 1966, and 1971-90 125
21. Leading States, commodities, for cash receipts, including net Commodity Credit Corporation loans, 1989 126
22. Income of farmers and farm people from all sources, 1945-89 128
23. Wheat: Area, yield, supply, disappearance, and prices, 1960-90 130
24. Corn (grain only): Area, yield, supply, disappearance, and prices, 1960-89 131
25. Soybeans: Area, yield, supply, disappearance, and prices, 1960-90 132
26. Cotton (all kinds): Area, yield, supply, disappearance, and prices, 1964-90 133

27. Cattle and calves: Inventory numbers, calf crop, disposition, production, and prices, 1960-91 134
28. Hogs: Inventory numbers, pig crop, disappearance, and prices, 1960-90 135
29. Sheep and lambs: Inventory numbers, lamb crop, disposition, production, and prices, 1962-91 136
30. Milk: Supply, utilization, and prices, 1960-90 137
31. Number of farms and land in farms, by State, June 1, 1988-90 138
32. Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, by ownership and region, 1952, 1962, 1970, 1977, and 1987 (1977=100) 139
33. Loan rates, target prices, and deficiency payment rates under Federal farm programs, 1975-90 crops 141

TABLES ON PROJECTS FOR WATER QUALITY ENHANCEMENT IN APPENDIX II 142

1. Demonstration projects 142
2. Nonpoint source hydrologic unit area projects 142
3. Water quality special projects 144
4. Management systems evaluation area projects 146

INTRODUCTION

THE NATION'S FOOD AND AGRICULTURAL INDUSTRY—AND THE AGENCIES OF THE USDA THAT SERVE IT

U.S. agriculture is Number 1.

Number 1 in the world, among all Nations' farm sectors. And Number 1 in this country, among all sectors of the U.S. economy.

With less than 7 percent of the world's land and less than 5 percent of the population, the United States produced 12.6 percent of the world's agricultural commodities, by value, in 1988. This country's output included nearly 15 percent of the world's livestock production and more than 11 percent of the crops.

U.S. farmers grow about 50 percent of the world's soybeans, 40 percent of the corn, and 25 percent of the grain sorghum. They also produce a staggering variety of other commodities. The 1987 Census of Agriculture listed more than 200, but there are more, since most minor specialty commodities are grouped together for statistical purposes.

In addition to providing a cornucopia of food and fiber for the U.S. consumer, farmers also provide for many of the other industrial, recreational, and aesthetic needs of the Nation.

Nearly 1.5 million farms, representing about three-quarters of the total 2.1 million farmers counted in the 1987 Census of Agriculture, produced livestock and poultry.

Although more farms produce beef cattle than any other kind of livestock, roughly a third of these farms keep 10 or fewer beef cows. These are frequently part-time or rural residence farms. Because of the low labor requirement, raising of beef cattle is well suited to small operations where farming is a sideline to the farm operator's primary occupation.

While most farmers focus on raising livestock and poultry that produce the major diet items of meat, poultry, and milk, some produce specialty livestock commodities that not only add variety to the food and fiber supply but also serve other needs.

The nearly 90,000 farmers raising horses and ponies for sale fill recreational demands. Other recreational demands are filled by farmers rearing game birds such as pheasant and quail. Nearly 40,000 honeybee keepers not only provide tables with a delicious sweetener, they provide a vital pollination service to many field crop and orchard farmers. Beekeepers rent hives of bees to farmers to pollinate crops to ensure high yields. Without bees, the production of most fruits, legume seeds, and many vegetables would be sharply reduced.

Crops were produced on more than 1.6 million farms in 1987. And the single commodity that is grown on more farms than any other is not corn, soybeans, wheat, or some other grain crop but rather hay. Hay crops accounted for about a fifth of the harvested cropland in 1987. Nearly half the Nation's farms—995,000—produce hay. Some farmers specialize in hay, their principal cash crop. But most of the hay is produced on other farms. Nearly half of all hay-producing farms are beef cattle or dairy farms, where hay is grown for livestock feed. Beef cattle and dairy farms accounted for 58 percent of the acreage in hay crops and 53 percent of hay tonnage produced in the country in 1987.

The $138 billion worth of 1988 U.S. agricultural production included $73.5 billion in crops and $64.3 billion in livestock.

In fiscal 1989, our country exported more than $39.7 billion worth of agricultural products—more than 12 percent of world farm trade. That U.S. total was nearly double the amount exported by second-place France. Production from about 40 percent of U.S. cropland went overseas during the year ending in 1989.

The United States is also one of the top importers of farm products, buying $21.5 billion worth in fiscal 1989.

21 Million Jobs

The U.S. food and fiber system accounts for more than 16 percent of the Nation's gross national product. Agriculture and its related industries provide jobs for 21 million people, from farmers to processors to supermarket clerks.

Farming itself employs over 2 million people—as many as the auto, steel, and transportation industries combined. The various sectors of the food and fiber industry include:

- Meat and poultry processing—372,000 employees and a payroll of $4.7 billion annually.
- Dairy product manufacturing—163,000 employees and a payroll of $1.9 billion annually.
- Canned, cured, and frozen food—238,000 employees and a payroll of $3.2 billion annually.
- Baking—210,000 employees and a payroll of $2.6 billion annually.
- Cotton mills and factories—102,000 employees and a payroll of $1.4 billion annually.

In total, U.S. agriculture's related industries require the services of some 19 million workers to transport, process, store, and market the output of the Nation's farms and ranches.

The Pantry Is Always Full

U.S. consumers spent $507 billion for food in 1989. The 350 million tons of food we consumed had to be transported, inspected, stored, graded, processed, packaged, wholesaled, and retailed.

Supermarkets offer as many as 15,000 different products, many of which last only a few years before something better is developed. American consumers are attracted to newer, more convenient food products, and the food companies turn out a steady stream of different items.

Farmers receive about 24 cents out of each dollar spent for U.S. farm-raised food, 30 cents out of every dollar spent in food stores, and 16 cents out of every dollar spent for meals eaten out. (In other words, the waiter or waitress who brings the food from the restaurant kitchen to the table and gets a 15 percent tip receives nearly as much as the farmer for spending a year producing the food.) The rest goes for processing, packaging, marketing, and the other steps along the road from farm to market and table.

Consumer prices and prices received by farmers

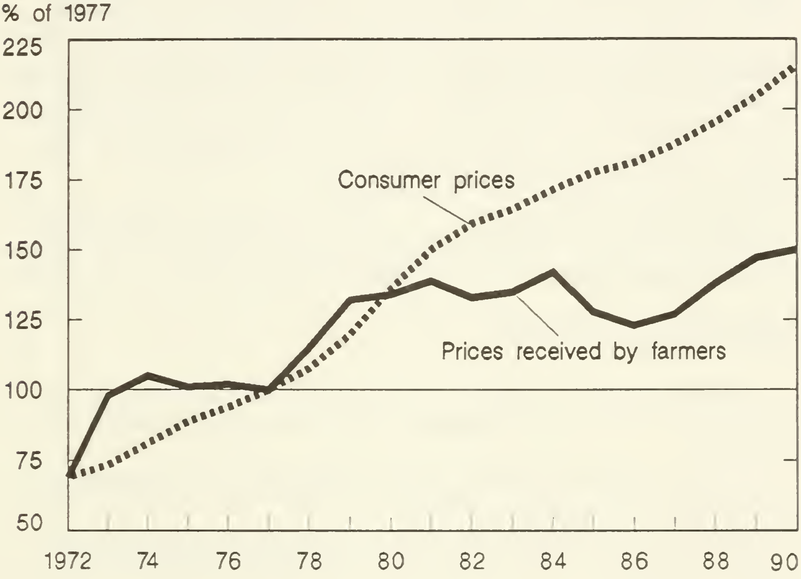


Figure 1

In 1989, producers got 57 cents out of each retail dollar spent on Choice beef, about 50 cents from a dollar spent on milk, and only 6 cents for the wheat in a dollar's worth of bread.

U.S. Farmers Are Highly Efficient

Each of the approximately 2.8 million U.S. farmworkers in 1988 supplied enough food and fiber for more than 100 people—74.3 in the United States and 26.5 abroad. That indicates that the 2.1 million farmers (farm operators, who actually may total about 2.2 million, since USDA economists believe not all were counted during the tally weeks used for average employment estimates) each provided food and fiber for 128 people—94.3 in the United States and 33.7 abroad. Besides farm operators, there were about a million paid workers and 600,000 unpaid farm family workers. Output per acre was 40 percent higher in 1987 than in 1967. An hour of farm labor produced nearly 8 times as much food and other crops in 1987 as it did in 1947.

Table 1.—The amount of food a worker's hourly pay (before taxes) would buy

Food item	1970	1990
White bread	13.3 lbs	14.4 lbs.
Frying chickens	7.9 lbs.	11.1 lbs.
Milk	9.0 half gals.	7.0 half gals.
Fresh potatoes	36.0 lbs.	27.0 lbs.
Eggs	5.3 doz.	9.9 doz.
Ground beef	5.0 lbs.	6.3 lbs.

Total U.S. agricultural production is more than 262 percent of what it was in 1930, while input use has fallen 8.7 percent during the same period. U.S. farmers produce 7.4 times as much per work-hour as they did 40 years ago. Farms have expanded in size and become more dependent on capital and on purchases from the nonfarm economy.

Of the Nation's 2.17 million farms in 1988, 319,000 (14.7 percent) each sold at least $100,000 worth of products. But most of the farms are small—nearly 60 percent sold less than $20,000 worth of products each in 1987.

USDA Serves U.S. Citizens

USDA and its various agencies provide many services to agriculture, business and industry, rural residents, and U.S. citizens in general. For example:

Agricultural Marketing Service (AMS) is responsible for market information, grading, and regulatory services.

Agricultural Research Service (ARS) and Cooperative State Research Service (CSRS) conduct and administer a wide variety of agricultural research programs.

Agricultural Stabilization and Conservation Service (ASCS) administers commodity and conservation programs used by a large portion of farmers and rural land owners.

Animal and Plant Health Inspection Service (APHIS) works to control animal and plant diseases and pests.

Economic Research Service (ERS) conducts research and analyzes data in various areas of agricultural economics.

Extension Service (ES) provides educational and informational services and is the Federal partner in the Cooperative Extension System that links 74 land-grant universities and more than 3,100 county offices.

Farmers Home Administration (FmHA) provides loans to farmers and other rural residents.

Federal Grain Inspection Service (FGIS) and Food Safety and Inspection Service (FSIS) administer various inspection programs needed to ensure safe granaries and food supplies.

Food and Nutrition Service (FNS) handles a number of food programs that help needy children and adults be adequately fed.

Foreign Agricultural Service (FAS) represents U.S. agriculture in foreign trade matters, assists in the exporting of U.S. farm products, and gathers information about world crops, policies, and markets.

Forest Service (FS) administers conservation and utilization programs covering forest lands.

National Agricultural Statistics Service (NASS) gathers data and issues reports on many aspects of U.S. agriculture that help food and fiber industries in business transactions.

Soil Conservation Service (SCS) administers national soil and water conservation programs aimed at helping advise producers and consumers in wisest use of natural resources.

Other USDA agencies, as well, provide numerous services to U.S. agriculture and all the citizens of the Nation. For additional details, note Appendix VII on How to Get Information from the United States Department of Agriculture.

I. THE U.S. FOOD AND FIBER SECTOR

1. COST OF FOOD SERVICES AND DISTRIBUTION

The estimated bill for marketing domestic farm foods—which does not include imported foods—was $338 billion in 1990. This covered all charges for transporting, processing, and distributing foods that originated on U.S. farms. It represented 76 percent of the $444 billion consumers spent for these foods. The remaining $106 billion represented the payment, or gross return, that farmers received.

The cost of marketing farm foods has increased considerably over the years, mostly because of rising costs of labor, transportation, food packaging materials, and other inputs used in marketing, and also because of the growing volume of food and increase in services provided with the food.

In 1980, the cost of marketing farm foods amounted to $183 billion. In the decade after that the cost of marketing rose about 85 percent. In 1990, the marketing bill rose 6 percent.

These rising costs have been the principal factor affecting the rise in consumer food expenditures. From 1980 to 1990, consumer expenditures for farm foods rose $180 billion. Over four-fifths of this increase resulted from an increase in the marketing bill.

The cost of labor is the biggest part of the total food marketing bill. Labor used by assemblers, manufacturers, wholesalers, retailers, and eating places cost $154 billion in 1990. This was 6 percent more than in 1989 and 90 percent more than in 1980.

Labor costs have risen more slowly in recent years, because of smaller increases in wages and benefits. Improvements in output per work-hour, or productivity, have slowed significantly since 1980 and offset a very small part of the rise in hourly earnings of food marketing employees.

The total number of food marketing workers in 1990 was about 12 million, over 30 percent more than a decade ago. The growth in employment occurred mostly in food stores and public eating places.

2. FOOD EXPENDITURES AND PRICES

Total food expenditures, which include imports, fishery products, and food originating on farms, were $515.6 billion in 1989, an increase of 6.1 percent over those in 1988. The average was $2,089 per capita, 5.1 percent above the 1988 average.

While food expenditures rose 6.1 percent, disposable personal income increased 7.1 percent from 1988 to 1989.

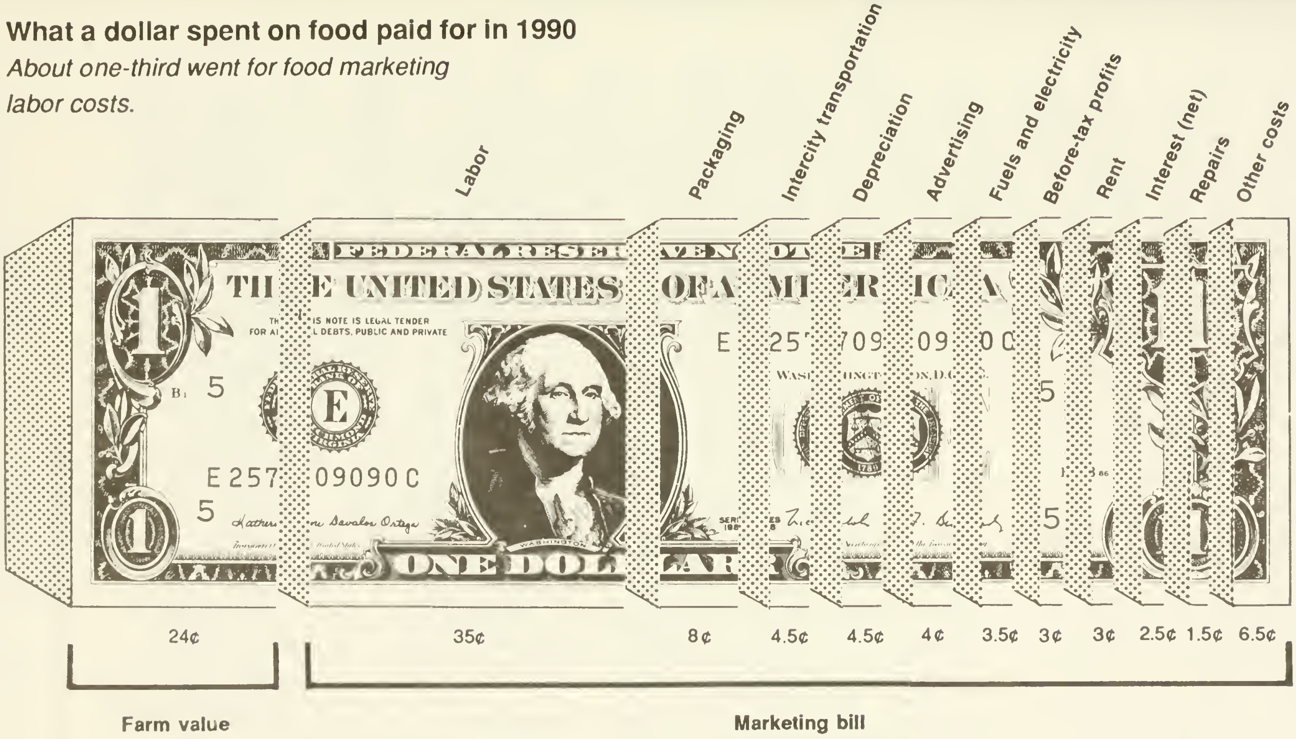
U.S. consumers in 1989 spent 11.8 percent of their disposable personal income (after taxes) on food. This figure compares with 11.9 percent in 1988, 14.1 percent in 1975, and 15.3 percent in 1965.

Other comparisons also are available. For example, U.S. consumers' at-home food expenditures in 1986 as a proportion of personal consumption

Figure 2

What a dollar spent on food paid for in 1990

About one-third went for food marketing labor costs.



Includes food eaten at home and away from home. Other costs include property taxes and insurance, accounting and professional services, promotion, bad debts, and many miscellaneous items.

spending totaled 8.5 percent, compared with Canada's 12.1 percent, Australia's 15.8 percent, West Germany's 17.4 percent, Japan's 19.4 percent, the Soviet Union's 28 percent, Mexico's 33.1 percent, and India's 54.2 percent.

Away-from-home food expenditures in 1986, as a proportion of personal consumption spending, totaled 6.1 percent for U.S. consumers; data from other selected countries show the following: India 1.0 percent, Israel 3.5 percent, Canada 6.5 percent, and the United Kingdom 11.7 percent.

Meanwhile, retail food prices (including meals served in restaurants) rose 52.5 percent over the last 10 years (1980-90). Prices of food eaten away from home increased 59.9 percent, while retail foodstore prices increased 49.7 percent.

Prices of goods and services, excluding food, in the Consumer Price Index climbed 59.9 percent over the 10 years. Transportation was up 45 percent; housing, 58.4 percent; medical care, 117.4 percent; and apparel and upkeep, 36.5 percent.

3. FARM-RETAIL PRICE SPREAD

Food prices include payments for both the raw farm product and marketing services. In 1990 the farm value, or payment for the raw product, averaged 30 percent of the retail cost of a market basket of U.S. farm foods sold in foodstores. The other 70 percent, the farm-retail price spread, consisted of all processing, transportation, wholesaling, and retailing charges incurred after farm products leave the farm.

Over the past 10 years, the farm-retail spread has risen much more than the farm value; the farm share declined.

Farm-retail spreads have increased every year for the past 10 years, largely reflecting rising costs of labor, packaging, and other inputs. In 1990, farm-retail spreads rose about 7 percent. Farmers received 6.2 percent more for food commodities in 1990 than they did the preceding year. Widening farm-retail spreads continued to push up food costs in 1991. The farm value is expected to decline in 1991.

The share of the food dollar spent in grocery stores represented by the farm value was expected to average about 29 cents in 1991. This share ranged from 30 to 38 percent during the past decade.

The percentage of the retail price accounted for by farm value varies widely among foods, reflecting differences in production and marketing functions. It is larger for animal products than for crop-based foods. Farm value is a relatively small share of the retail selling price of foods that require considerable processing and packaging. The wide variation in the farm value share among major food groups in the farm food market basket is shown in table 2.

4. PER CAPITA FOOD CONSUMPTION

In 1986, residents of the United States consumed an estimated 2,208 pounds of food per capita. On a retail weight basis, the historic estimate of the per capita food supply has averaged about 1,400 pounds a year. These

Table 2.—Farm value as a percentage of retail price for domestically produced foods, 1980 and 1990

Items	1980	1990
Livestock products:		
Meats	51	46
Dairy	52	39
Poultry	54	44
Eggs	64	56
Crop products:		
Cereal and bakery	14	8
Fresh fruits	26	23
Fresh vegetables	27	30
Processed fruits and vegetables	23	26
Fats and oils	29	23
Market basket, average	37	30

figures roughly compare with 1,011 pounds in China, 1,072 pounds in Africa, and 1,288 pounds in Latin America.

The 1989 U.S. per capita food supply averaged 142 pounds of red meat (mostly beef and pork), on a carcass-weight basis; 90 pounds of chicken and turkey, on an entire dressed-weight-bird basis; 97 pounds of fresh fruit; roughly 20 pounds of fresh melons; 99 pounds of the 12 major fresh-market vegetables for which per capita estimates are made; 568 pounds of dairy products, on a milk-equivalent basis; and a wide variety of other foods.

A retail price-weighted quantity index put the 1988 per capita food supply up 5.4 percent from 1983, as consumption of crop-derived foods outpaced consumption of foods from animal products.

The crop index rose 7.8 percent between 1983 and 1988, compared with a 3.6-percent rise in the animal index. Average consumption of foods in most crop categories rose steadily during the 5-year period, especially vegetables for freezing (up 25 percent), fresh vegetables (up 22 percent), flour and cereal products (up 14 percent), frozen potatoes (up 13 percent), peanuts and tree nuts (up 12 percent), and fresh fruits (up 10 percent). Consumption of coffee, vegetables for canning, and potato chips declined 8 percent, 6 percent, and 5 percent, respectively.

In contrast, Americans used less fluid whole milk (down 18 percent), eggs (down 6 percent), red meat (down 5 percent), and animal fats (down 3 percent), moderating the increase for animal products. Increases in per capita consumption of fluid lowfat milk products (up 26 percent), poultry (up 24 percent), fluid cream products (up 21 percent), cheese (up 17 percent), and fish and shellfish (up 16 percent) kept average overall consumption of animal products from falling.

II. FARM PRODUCTION, INCOME, AND VALUES

5. INPUTS FOR AGRICULTURE

The three basic "inputs" for agricultural production are land, labor, and capital.

Land is no longer the major production tool. The productivity of the land now depends on the skill and knowledge with which capital is applied: the use of mechanical power and machinery, fertilizer, lime, better seed, pest control chemicals, and the technology applied to conserve and enhance the land while in productive use.

The total volume of all resources in agriculture—land, labor, machinery, and supplies—has declined 15.4 percent since 1955. The composition of inputs has changed dramatically as farmers have struggled to become more productive and more efficient. Farm labor inputs have declined rapidly; farm real estate input has fallen far less. All other inputs, chiefly purchased, have increased rapidly. Purchased inputs are about 42 percent greater than in 1955; nonpurchased inputs have declined by almost 50 percent.

6. LAND

More than half of the 2.3 billion-acre land area of the United States is used to produce crops and livestock. The rest is distributed among forest land (25 percent); urban, transportation, and other uses (12 percent); and unused lands.

Our non-Federal cropland resources in 1987, according to the Soil Conservation Service (SCS) National Resources Inventory, consisted of 422.8 million acres, of which 377 million acres are cultivated for crops, 39 million acres are used for hay, and 7 million acres are in horticultural uses. About 55 percent of these areas is prime farmland, which is the best land for producing food and fiber.

The Nation has about 991.7 million acres of other non-Federal rural land currently being used for pasture, range, forest, and other purposes. About 153 million acres are suitable for conversion to cropland if needed. Of this, 35 million acres have a high potential for conversion to cropland, and 118 million acres have a medium potential. The remaining rural land has little or no potential for conversion to cropland.

This means that the cropland reserve is limited to about 14 percent of the remaining non-Federal land. Most of this land would require careful soil and water management if brought into intensive agricultural use, and doing so would further diminish our supply of pasture, range, or forest land.

Table 3.—U.S. land ownership and use in 1987, excluding Alaska

Type of land	Hectares (millions)	Acres (millions)	Percentage of total
Federal land	164	404	21
Non-Federal land	601	1,486	79
Total land area	765	1,890	100

Source: Data provided by Soil Conservation Service, U.S. Department of Agriculture

7. WATER

U.S. precipitation varies from nearly none in the Death Valley Desert in California to more than 100 inches per year in some areas, for example, the Olympic Mountains in Washington. The average for the 48 contiguous States is 30 inches per year—a total of 1,570 trillion gallons. This total does not change much from year to year, but precipitation at any location may vary greatly. Two-thirds of this water evaporates from wet surfaces or soaks into the soil to sustain crops, pastures, rangeland, and forests. The other third percolates deep into the ground or finds its way into streams. Water in the streams can be used for navigation, recreation, or power generation. It also can be diverted from streams and (with water pumped from underground) used for domestic irrigation, industry, and other purposes.

In 1987, 46.4 million acres of land were irrigated in the 50 States, a decrease from the 49 million of 1978. Most of the acreage increase in irrigated land since 1964 occurred in the 17 Western States and Louisiana. The greatest percentage increase since 1964 occurred in the 31 Eastern States, Alaska, and Hawaii.

Table 4.—Non-Federal use of land in the United States, excluding Alaska, in 1987

Type of land	Hectares (millions)	Acres (millions)	Percentage of total
Cropland	171	423	28
Pastured land	53	130	9
Rangeland	163	402	27
Forest land	159	394	27
Urban, built-up, and transportation areas less than 10 acres in size	32	77	5
Minor land cover	24	60	4
Total land area	602	[1]1,486	100

[1] Does not include 14 million acres of non-Federal land in Alaska

Source: Data provided by Soil Conservation Service, U.S. Department of Agriculture

Water withdrawn and then returned to streams may be used again as long as acceptable quality is maintained. Only water that is used up (mainly by evaporation and transpiration) so that it does not return to streams reduces the total usable water supply. Agriculture uses 80 out of every 100 gallons that are lost.

Management of water is becoming increasingly important as use approaches available supply. Shortages can occur in any region in any year. In some Western States, current use is already pressing heavily on available supplies. Cities and industries are using increasing amounts and thus intensifying supply and treatment problems. Water pollution is today a major water management problem in most regions.

The total supply of water will not increase. However, more water may be made available for use by conservation, demineralization, storage in surface reservoirs, recharging underground aquifers of water-bearing rocks, converting brushland to grass in lower rainfall areas, and managing vegetative cover, including forests, so as to capture and retain more snowfall.

Water quality and quantity can be improved and energy use reduced by improving irrigation practices. An average water-use efficiency of 70 to 75 percent is an achievable goal.

Table 5.—Specified U.S. crops harvested by acres irrigated in 1987

Crop	Irrigated acreage[1] (1,000 acres)
Corn	8,812
Hay	8,595
Cotton	3,544
Land in orchards	3,359
Wheat	3,731
Rice	2,425
All vegetables harvested for sale	2,205
Sorghums for grain or seed	1,306
Barley	1,341
Soybeans	2,592
Irish potatoes	887
Sugar beets for sugar	645

[1] All farms.

Source: 1987 Census of Agriculture, Bureau of the Census, U.S. Department of Commerce.

8. FARM LABOR

Labor use on U.S. farms has changed dramatically over the last several decades. Average annual farm employment dropped from 9.9 million in 1950 to 3.1 million in 1989. This decrease resulted largely from the trend toward fewer and larger farms, increased farm mechanization and other technological innovations, and higher off-farm wages. However, farm employment appears to have stabilized in recent years as increases in mechanization and laborsaving technology have leveled off and the downward trend in farm numbers has slowed.

Family workers, including farm operators and unpaid workers, accounted for 62 percent of farm labor in 1989, while hired workers accounted for 30 percent. A recent change in farm labor use patterns has been the increased use of service workers, including crew leaders and custom crews, who accounted for 8 percent of all workers on farms in 1989 compared to less than 2 percent in 1980.

The average wage rate for hired farm workers in the United States in 1989 was $5.36 per hour compared to $5.02 in 1988. Wages varied by type of worker: livestock workers averaged $4.77, field workers averaged $5.12, and supervisors averaged $8.20 in 1989.

A significant portion of total farm production expenses is spent on labor. The 1987 Census of Agriculture reported that expenditures for hired and contract labor on U.S. farms was $12.7 billion in 1987, or almost 12 percent of total farm production expenses. About 39 percent of all farms had hired labor expenses and 13 percent had contract labor expenses.

The importance of labor varied significantly by farm type and size of farm. The proportion of total farm production expenses attributed to hired and contract labor expenses was greatest on horticultural specialty farms (44 percent), fruit and tree nut farms (40 percent), and vegetable and melon farms (37 percent). These types of farms are the least mechanized and many of the commodities they produce are still harvested by hand. At the other extreme, labor expenses comprised less than 8 percent of all production expenses on beef cattle, hogs, and sheep; poultry; and cash grain farms.

Larger farms are more likely to have labor needs in excess of that provided by the farm family. Farms of 260 or more acres, which accounted for only 31 percent of all farms, had 69 percent of all labor expenses. In terms of sales class, the 25 percent of all farms with $50,000 or more of value of product sold accounted for 93 percent of all labor expenses.

Table 6.—Farm production expenses, 1969, 1974, 1979, 1982, 1987, and 1989

[In billions of dollars]

Major items	1969	1974	1979	1982	1987	1989
Purchased feed	7.1	14.5	19.3	18.6	18.0	22.7
Purchased livestock	4.2	5.1	13.0	9.7	11.8	13.0
Repair and maintenance	4.5	6.7	7.3	6.4	6.8	7.8
Capital consumption	6.6	10.5	19.3	24.3	16.5	17.3
Fertilizer and lime	2.3	6.1	7.4	8.0	6.5	7.6
Short-term interest	1.4	2.9	6.9	11.3	7.3	7.5
Mortgage interest	1.6	2.8	6.2	10.5	8.2	7.6
Property taxes	2.5	3.1	3.9	4.0	5.0	5.3
Labor	4.2	6.1	9.0	10.1	10.8	11.9
Total production expenses	42.1	71.0	123.3	140.0	127.7	142.6

9. FARM MACHINERY

Increased agricultural mechanization since the 1940's has helped make U.S. farmers among the most productive in the world. Increases in the power and size of farm machinery have dramatically reduced labor requirements in the United States, spurring the mass migration of nearly

7 million people from the farm sector since World War II.

Many crop production activities that once required either intensive seasonal labor or constant attention are now easier to manage as farms have become more mechanized. For example, fresh fruits and vegetables are now available to consumers year round, due in part to more efficient mechanical harvesting, improved storage and transportation, and increased mechanization throughout the entire marketing chain.

Along with mechanization of their operations, farmers began to use other purchased inputs more intensively. The development of higher yielding crop varieties, commercial fertilizers, pesticides, and effective application equipment encouraged farmers to increase agrichemical use more than eightfold between 1945 and 1982. Greater use of purchased inputs has helped total annual U.S. crop production more than double during this period.

Livestock increasingly are being raised in highly efficient, confined facilities. Automated feeding, watering, and milking systems have improved feed conversion rates and increased productivity, thus lowering unit production costs and freeing growers for other enterprises.

In the case of field crop production, many farmers are adopting conservation tillage practices in order to lower operating costs, to reduce soil erosion, or to meet conservation standards as outlined in the 1985 farm bill. Implements such as ridge-till planters and no-till drills allow farmers to plant crops with little or no seedbed preparation.

Today, U.S. agriculture can generally be characterized as a mature market for farm machinery where tractors and implements are purchased to replace older equipment.

Since 1979, when farmers purchased a record $11.75 billion of new and used machinery, high real interest rates, declining profitability in agriculture, and, more recently, paid land diversions helped drive farm machinery expenditures down to a low of 4.6 billion by 1986. Farm machinery sales rose to $7.94 billion in 1989 as farm incomes improved and farmers sought to replace older equipment.

The U.S. farm machinery industry has responded to the downturn in demand by offering attractive sales incentives. It also has reduced total output to reduce shortrun operating costs and market inventories and has undertaken consolidation efforts to reduce excess productive capacity. With the recent improvement in farm machinery sales, farmers are not likely to see sales incentives as significant as those offered in recent years.

10. FARM EXPENSES

Farmers spent $143 billion on production goods and services in 1989, about 75 cents for every dollar of gross income from farming and government payments. Expenses in 1989 were 8 percent higher than in 1988, after rising 3 percent between 1987 and 1988.

Production expenses increased each year between 1953 and 1982 and then rose again in 1984. Expenses fell 8 percent between 1984 and 1985 and 5 percent between 1985 and 1986. Although expenses have risen in

Table 7.—Indexes of total farm input and major input subgroups, United States, 1920-89*

(1977=100)

Year	Total inputs*			Farm* Labor[3]	Farm real estate[4]	Machanical power and machinery[5]	Agricultural chemicals[6]	Feed, seed, and livestock purchases[7]	Taxes and interest[8]	Miscellaneous[9]
	All	Nonpurchased[1]	Purchased[2]							
1920	90	180	36	324	105	27	5	23	62	65
1921	87	170	36	299	103	27	3	26	74	59
1922	88	173	37	309	104	26	4	25	72	60
1923	89	174	37	311	104	27	4	25	72	60
1924	90	176	39	315	104	27	5	31	71	62
1925	91	177	39	321	103	28	5	28	69	63
1926	92	177	41	322	103	29	5	29	71	65
1927	91	174	41	309	104	31	5	29	72	61
1928	93	177	42	315	105	32	6	29	73	62
1929	93	177	42	312	107	33	6	28	75	62
1930	93	176	42	309	104	34	6	27	76	60
1931	92	178	40	316	102	32	5	24	77	63
1932	89	173	38	305	100	30	4	25	80	61
1933	88	170	38	304	100	27	4	26	77	60
1934	82	156	37	273	100	27	5	25	70	55
1935	84	158	39	284	102	28	5	23	64	55
1936	85	156	42	276	102	29	6	31	69	54
1937	90	164	44	298	104	32	7	30	64	59
1938	88	158	44	278	104	33	7	31	70	55
1939	90	158	47	279	105	34	7	37	73	56
1940	91	159	48	278	107	36	9	39	74	57
1941	92	158	49	273	105	37	9	42	74	57
1942	95	166	50	280	103	44	10	44	75	55
1943	96	166	51	276	102	47	11	48	78	57
1944	97	167	52	274	101	49	13	48	80	59

Table 7.—Indexes of total farm input and major input subgroups, United States, 1920-89*—Continued

(1977=100)

Year	Total inputs*			Farm* Labor[3]	Farm real estate[4]	Machanical power and machinery[5]	Agricultural chemicals[6]	Feed, seed, and livestock purchases[7]	Taxes and interest[8]	Miscellaneous[9]
	All	Nonpurchased[1]	Purchased[2]							
1945	94	161	51	257	102	50	13	50	82	58
1946	93	155	53	247	106	49	14	49	82	59
1947	104	174	59	297	106	54	15	51	82	60
1948	104	170	60	285	107	62	16	52	80	63
1949	108	172	65	285	108	68	18	56	83	66
1950	106	167	64	265	109	72	19	58	83	63
1951	106	164	66	251	109	77	21	62	84	68
1952	105	162	67	237	108	81	23	63	86	67
1953	103	157	66	220	108	82	24	63	87	67
1954	102	157	65	214	108	82	24	65	87	65
1955	104	155	69	220	108	83	26	66	89	68
1956	103	150	70	212	106	84	27	69	89	65
1957	100	142	69	196	105	83	27	68	88	68
1958	98	136	71	182	104	83	28	73	89	71
1959	101	135	74	183	105	84	32	77	94	75
1960	99	130	76	177	103	83	32	77	95	77
1961	98	125	76	167	103	80	35	81	96	78
1962	98	124	78	163	104	80	38	83	98	81
1963	98	118	80	155	104	79	43	83	99	83
1964	98	116	81	148	104	80	46	85	101	87
1965	97	114	82	144	103	80	49	86	101	85
1966	96	111	83	132	102	82	56	89	102	82
1967	98	109	87	128	104	85	66	92	102	80
1968	97	109	87	124	102	86	69	89	102	85
1969	96	106	87	118	102	86	73	93	101	85

Table 7.—Indexes of total farm input and major input subgroups, United States, 1920-89*—Continued

(1977=100)

Year	Total inputs*			Farm* Labor[3]	Farm real estate[4]	Machanical power and machinery[5]	Agricultural chemicals[6]	Feed, seed, and livestock purchases[7]	Taxes and interest[8]	Miscellaneous[9]
	All	Nonpurchased[1]	Purchased[2]							
1970	96	106	87	112	105	85	75	96	102	89
1971	97	103	90	108	103	87	81	102	101	89
1972	97	103	91	110	102	86	86	104	102	92
1973	98	103	93	109	100	90	90	107	102	90
1974	98	103	93	109	99	92	92	99	103	87
1975	97	103	90	106	97	96	83	93	100	82
1976	98	100	96	100	98	98	96	101	102	90
1977	100	100	100	100	100	100	100	100	100	100
1978	102	100	105	100	100	104	107	108	99	103
1979	105	100	111	99	103	104	123	115	103	113
1980	103	100	106	96	103	101	123	114	100	96
1981	102	98	106	96	104	98	129	108	99	108
1982	99	96	102	93	102	92	118	107	95	116
1983	96	93	101	97	101	89	102	103	99	101
1984	96	91	101	92	99	86	120	106	93	110
1985	92	87	97	85	97	80	115	102	96	116
1986	89	84	94	80	96	77	104	110	97	110
1987	89	82	95	78	95	73	111	117	100	122
1988	87	80	94	75	94	72	111	110	97	119
1989[10]	88	79	98	76	93	73	122	119	94	123

*Revisions made in 1984 in the labor input series produced extensive changes to the indexes for labor, purchased, nonpurchased, and total input indexes.

[1] Includes operator and unpaid family labor, and operator-owned real estate and other capital inputs.

[2] Includes all inputs other than nonpurchased inputs.

[3] Includes hired, operator, and unpaid family labor.

[4] Includes all land in farms, service buildings, grazing fees, and repairs on service buildings.

[5] Includes interest and depreciation on mechanical power and machinery repairs, licenses, and fuel.

[6] Includes fertilizer, lime, and pesticides.

[7] Includes nonfarm value of feed, seed, and livestock purchases.

[8] Includes real estate and personal property taxes, and interest on livestock and crop inventory.

[9] Includes such things as insurances, telephone, veterinary fees, containers, and binding materials.

[10] Preliminary

each of the last 3 years, they remained 1 percent below 1984. Table 7 shows some major expense items for selected years from the last two decades.

Much of the decline in expenses was due to lower input prices, acreage reduction caused by government programs and lower commodity prices, lower per-acre application rates, and, in general, more cost-conscious management.

The index of prices paid for production items, interest, taxes, and wage rates rose 4 percent between 1988 and 1989, nearly 4 percent less than the increase in total expenses. Planted and harvested acres rose 3 percent and 5 percent, respectively, between the 2 years.

A longer perspective shows that total production expenses (not adjusted for inflation) increased by 352 percent between 1964 and their peak in 1984 but then fell 12 percent between 1984 and 1986. Expenses have risen 14 percent since 1986, with more than half of that rise occurring in the last year. Much of the long-term increase in production expenses was due to inflation, increased capital investment in agriculture, and greater purchases of services and inputs.

The index of prices paid by farmers for production items, interest, taxes, and wage rates rose 283 percent between 1964 and 1989, and 34 percent between 1979 and 1989. This index of farm input prices increased less, however, than the Consumer Price Index (CPI), which rose by 300 percent between 1964 and 1989 and by 71 percent between 1979 and 1989.

As farm operations over time have become more specialized, farmers have invested in special machinery, equipment, and buildings. Specialization has also led to greater purchases of goods and services from others. For example, many farmers buy feed rather than grow it. Suppliers may construct buildings, install fences, test soils, or lease equipment—activities that most farmers used to perform themselves.

Farmers also increased their use of credit. Total farm-related debt increased each year from 1953 to 1983. During the first part of this period, the increase was relatively steady. In the late seventies and early eighties, the increase accelerated until total debt peaked at the end of 1983 at $206.5 billion. Since then, total farm debt declined to $146 billion in 1989, as farmers purchased fewer inputs and capital items or bought them more frequently with cash.

Interest paid by farmers followed a pattern similar to that for total debt—steady increases since the forties and then an acceleration in the late seventies and early eighties. Interest expenses peaked in 1982 at $21.8 billion. They declined to $15.1 billion in 1989. Part of the increase in the late seventies was due to increases in interest rates.

Expenses for major overhead items—capital consumption, taxes, and interest on farm mortgage debt—tended to rise faster than current operating expenses in the late 1970's and early 1980's. Operating expenses during that period fell 3 times and rose twice. In 1988 and 1989, overhead expenses rose 0.2 and 2 percent, while operating expenses rose 5 percent and 9 percent, respectively.

USDA forecasters expect production expenses to have increased again for 1990. They project that 1990 expenses will have been about $145 billion, a rise of less than 2 percent, corresponding with a 1-percent increase in planted and harvested acres.

11. FERTILIZER

Commercial fertilizers enable farmers to maintain soil fertility, increase production, and reduce unit costs of crop production through increased yields per acre and per farmworker.

Farm consumption of primary plant nutrients—nitrogen (N), phosphate (P2O5), and potash (K2O)—in the United States rose to a record 23.7 million tons in 1981, ending a 40-year expansion in fertilizer use.

After 1981, fertilizer consumption dropped 24 percent to 18.1 million tons in 1983, following a sharp drop in crop acres in that year.

In 1984, fertilizer use increased to 21.8 million tons because of a rebound in crop acres and remained close to that total in 1985. However, by 1987 fertilizer use dropped again to 19.1 million tons as crop acreage declined, but equaled 19.6 million tons in 1989 as crop acreage increased.

Fertilizer application rates are beginning to level off or even decline for some crops, making consumption of plant nutrients heavily dependent on crop acres planted.

Nitrogen is about 54 percent of total nutrient consumption, while phosphate and potash are 21 and 25 percent, respectively.

Four crops—corn, cotton, soybeans, and wheat—use about two-thirds of the primary plant nutrients. Corn alone uses over 40 percent of the total.

Mixed fertilizer and bagged fertilizer as a proportion of total fertilizer have continued to decline. In 1989, mixed fertilizer comprised about 39 percent of total consumption, compared with 46 percent 10 years earlier.

Dry bagged fertilizer made up 18 percent of total consumption in 1976, but declined to less than 9 percent in 1988. The proportion of dry bulk and fluid fertilizers was 52 and 39 percent, respectively, in 1988.

Farmers are using higher analysis fertilizer materials. Average primary nutrient content increased from 44 percent in 1976 to 46 percent in 1989. Nitrogen content increased the most—from about 22 percent in 1976 to about 25 percent in 1989. Potash content was up less than 1 percentage point in 1989 from 11.5 percent in 1976, while phosphate content was down over 1 percent to about 10 percent.

12. LIVESTOCK AND POULTRY FEED

Providing feed and feeding livestock and poultry are important parts of today's agricultural industry, involving not only the farmers and ranchers but also the formula feed and grain processing industry. About 28 percent of grains fed are used on the farms where they are grown. The rest moves through commercial channels.

In crop year 1986-87, the livestock and poultry industries consumed 478.0 million tons of feed and roughage, slightly less than the 480.3 million tons fed in 1965-66. The quantity of concentrates fed increased 35 percent, while roughage consumption declined 17 percent. This change reflects both increased intensity of feeding and productivity gains in livestock and poultry production.

Table 8.—Kinds and quantities of feed consumed by livestock and poultry, feeding years 1965-66 and 1989-90[1]

Feed materials	1965-66 feeding year (million tons)	Percent of total	1989-90 feeding year (million tons)	Percent of total
Grains:				
Corn	81.5	16	124.7	26.5
Other feedgrains	32.1	7	22.1	4.7
Wheat and rye	3.0	1	9.5	2.0
Protein feeds	31.7	6	45.2	9.6
Byproduct feeds	11.5	3	12.0	2.6
Total concentrates	160.4	33	213.5	45.4
Hay	49.4	10	55.7	11.9
Other harvested roughages	26.3	5	18.2	3.9
Pasture	249.1	52	182.7	38.9
Total roughage	324.8	67	256.6	54.6
Total, all feeds	485.3	100	470.1	100.0

[1] Measured in feed units (corn equivalents).

The livestock and poultry fed totaled 76.1 million grain-consuming animal units (GCAU) in 1986-87, up 2 percent from 74.4 million units on hand in 1965-66. Roughage-consuming animal units (RCAU) declined 11 percent from 88.9 million units to 79.0 million.

Some significant shifts occurred in the composition of the grain-and roughage-consuming animal units between 1965 and 1986. Poultry accounted for 28 percent of the GCAU's in 1986-87, compared with 22 percent of the total in 1965-66.

The major shift in the composition of RCAU's has been a decline in the number of dairy cows and heifers and a small increase in beef cattle and horses.

Pasture forage accounted for 38 percent of the total tonnage of feed used in 1986-87. This highlights the importance of the livestock industry in efficient use of land. Most of the area pastured is land that cannot be cropped. However, livestock enables this land to make a significant contribution to the food supply of the United States.

Technology for production of livestock and poultry has advanced tremendously, particularly in the last 20 years. This includes many innovations in feed formulation and handling.

Progress in feed technology has been possible through developments in nutritional knowledge and genetic improvement in both livestock and poultry. Research also has improved methods of housing livestock, and the bulk formulation, mixing, transporting, and distribution of feeds.

One result has been to reduce labor needed on farms. This has been associated with the development of very large poultry and livestock feeding enterprises.

Increasing quantities of poultry and livestock are coming from large enterprises built to a great extent around feed manufacturing. Most of these enterprises have a feed mill at or near the feeding location. Some feed their own livestock, but many others also feed livestock belonging to other firms or individuals. Many mills have custom grinding and mixing services and prepare feeds according to specifications of feed purchasers.

13. AGRICULTURAL CREDIT

The use of credit plays an important part in the sustained growth of agricultural productivity. In this regard a symbiotic relationship exists between agricultural producers and their lenders; as the health of one prospers so does the health of the other.

The financial condition of lenders serving agriculture continued to improve in 1990 and further gains were expected in 1991. All lenders reported that agricultural credit demand was up only slightly, while the capacity to lend remains high. Furthermore, recent financial reports indicated that all major institutional lender groups (Commercial Banks, Farm Credit System [FCS], and Life Insurance Companies [LIC]) continue to experience a decline in loan delinquencies, foreclosures, net loan chargeoffs, and loan restructurings. Total farm debt at the end of 1990 was estimated at $133.9 billion, down slightly from 1989.

Agricultural interest rates declined in 1990 and appeared likely to drop again in 1991. However, rates vary considerably by region and between lenders. The variation reflects the popular use of risk-based loan pricing techniques to hedge interest rate risk to the lender and greater lender concern over market share.

Risk-based loan pricing arose in response to the increasing variable nature of interest rates in general which occurred over the last 10 to 12 years of financial markets deregulation and the large loan losses which agricultural lenders absorbed as a result of the farm financial stress of the mid-1980's. Market share concerns are increasing competition among lenders for the most creditworthy customers, the top third of borrowers. Current loan pricing strategies indicate that competing for profitable loans won't degenerate into the irresponsible competition for market share that was characteristic at the beginning of the 1980's.

Loans made to agricultural producers are generally reported as real estate and non-real-estate loans. However, two other loan categories of substantial size include operator households and the Commodity Credit Corporation (CCC). Operator household debt is that portion of debt held in home mortgages and other items not directly related to the farm or ranch production unit. At the end of 1989, farm household debt for real estate and non-real-estate loans equaled $6.7 billion and $3.7 billion, respectively. Commodity Credit Corporation (CCC) loans consist of funds obtained in conjunction with participation in Government commodity programs. At the end of 1990, an estimated $7.0 billion was outstanding in CCC loans.

Real estate loans generally have terms greater than 1 year and sometimes as long as 40 years and are ordinarily used to purchase farmland or make major capital improvements to farm property. They may also be used to refinance existing debts. Farm real estate debt totaled an estimated $72.3 billion at the end of 1990.

Table 9.—Farm debts, 1950, 1960, 1970, 1980, and 1983-89

[In billions of dollars]

	Farm debt outstanding, December 31										
	1950	1960	1970	1980	1983	1984	1985	1986	1987	1988	1989
Real estate debt:											
Federal land banks	1.0	2.5	7.1	36.2	48.9	49.1	44.6	37.8	32.6	30.3	28.5
Life insurance companies	1.4	3.0	5.6	12.9	12.7	12.4	11.8	10.9	9.9	9.6	9.6
Banks	1.0	1.6	3.8	8.6	9.3	10.2	11.4	12.7	14.5	15.4	16.6
Farmers Home Administration	0.3	0.7	2.4	8.2	9.5	10.1	10.4	10.3	10.1	9.6	8.7
Individuals and others	2.5	5.0	11.4	30.2	32.3	29.9	27.2	24.0	20.6	18.0	17.0
CCC storage and drying facilities loans	*	*	0.1	1.5	0.9	0.6	0.3	0.1	*	*	*
Total	6.1	12.9	30.5	97.5	113.7	112.3	105.8	95.9	87.7	83.0	80.5
Nonreal estate debt:											
Banks	2.5	5.0	11.1	31.6	39.0	39.6	35.5	31.2	29.0	29.8	30.8
Production credit associations[1]	0.5	1.6	5.5	20.5	20.2	18.8	14.6	10.7	9.8	9.1	9.9
Farmers Home Administration	0.3	0.4	0.8	11.4	14.6	15.6	16.7	16.4	16.0	14.7	12.3
Individuals and others[2]	2.8	5.0	4.9	17.7	18.9	18.0	15.4	12.4	11.1	12.0	12.5
Total	6.1	12.0	22.3	81.2	92.7	92.0	82.2	70.8	66.0	65.6	65.5
Total	12.3	24.8	52.8	178.7	206.5	204.3	187.9	166.6	153.7	148.5	146.0

*Less than 0.05.

[1] Includes loans to other financial institutions.

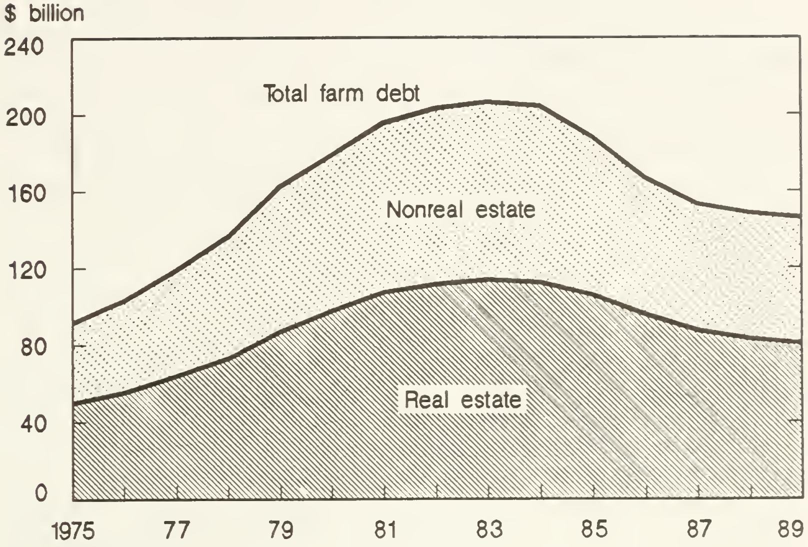
[2] Includes Small Business Administration loans.

Non-real-estate loans are typically made for less than 1 year, but may be made for up to 10 years in special situations. Non-real-estate loans are typically made to provide seasonal operating expenses, to make livestock purchases, and to purchase new machinery and equipment. Total non-real-estate debt is estimated at $61.5 billion at the end of 1990.

The FCS, having gone through substantial restructuring of both its loan portfolio and loan distribution network, consisted of 1 Federal Land Bank, 1 Federal Intermediate Credit Bank, 11 Farm Credit Banks, 3 Banks for Cooperatives, and 290 local Federal Land Bank Associations, Production Credit Associations, Agricultural Credit Associations, and Federal Land Credit Associations at the end of 1990. The FCS, in response to initiatives set forth in the Agricultural Credit Act of 1987, continues to consolidate its operations in efforts to reduce its overhead and improve operational efficiency.

At the end of 1990, the FCS held $26.6 billion or 36.7 percent of the total in long-term farm real estate loans. In addition, the FCS held $10.1 billion in non-real-estate loans, which comprised 16.4 percent of the total loans in this category. The FCS share of both total real estate and non-real-estate debt increased in 1990.

Farm debt



Farm loans outstanding December 31.

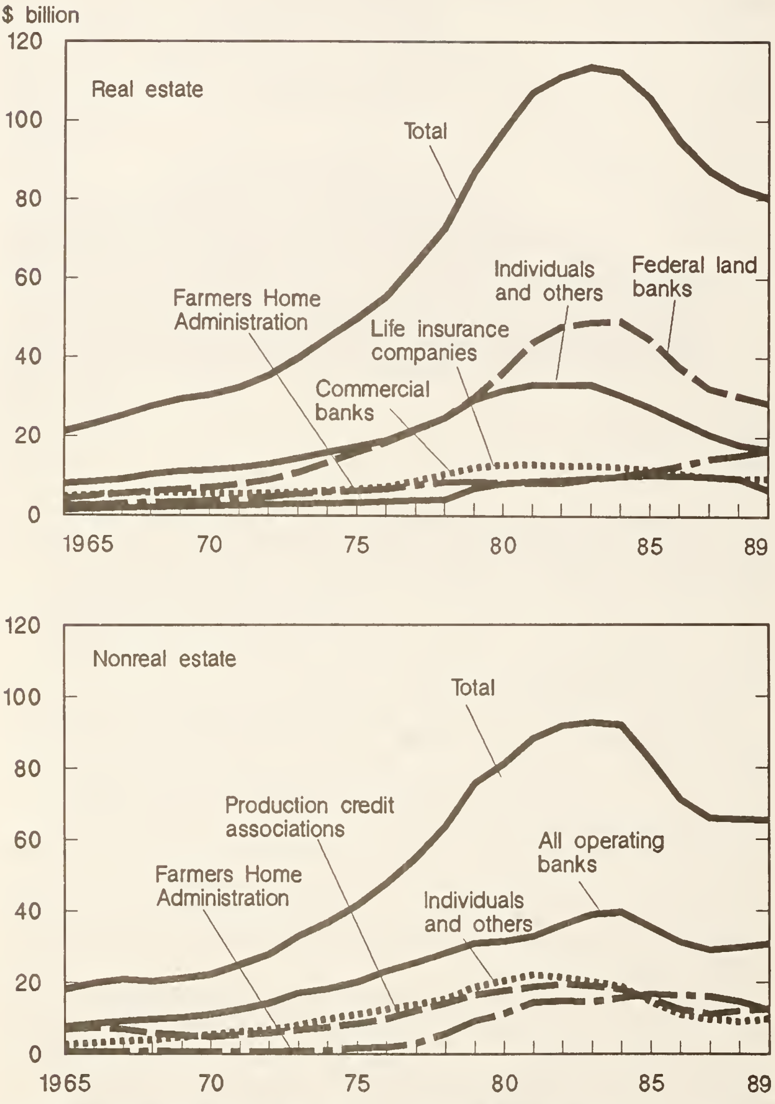
Figure 3

The financial health of the FCS continued to improve in 1990. The FCS had net income of $455 million on total net interest income of $904 million during the first 3 quarters of 1990. Furthermore, in 1990 the System's overall loan portfolio improved as the average cost of funds continued to decline, lowering the spread between the FCS's bonds and Treasury securities. This, in turn, translated into a more stable loan pricing environment for the FCS as a whole.

At the end of 1990, commercial banks held an estimated 22.1 percent of total real estate loans, or $16 billion, and 49.4 percent of non-real-estate loans, or $30.4 billion. Banks whose ratio of farm loans to total loans exceeded the unweighted average of such ratios at all commercial banks (16.1 percent-defined to be an agricultural bank by the Federal Reserve Board [FRB]) held $8.9 billion in real estate loans and $18.6 billion in non-real-estate loans at mid-1990. These banks are typically small rural community banks that are much more dependent on agricultural loans for their profits. There were 4,193 of these banks at mid-1990— down from 5,156 in 1982.

Agricultural (FRB definition) commercial banks have nearly completed their recovery from the farm financial crisis of the mid-1980's. Mid-year results for 1990 suggest an 11.2 percent rate of return-to-equity, which is better than what all banks report as a group. These improvements in previous-year measures were aided by the continued decline in the number of nonperforming loans. Loan-to-deposit ratios at agricultural banks still indicated ample available credit and showed a slight decrease

Who holds the farm debt?



Individuals and others include Commodity Credit Corporation real estate loans. Production credit associations include Federal Intermediate Credit Bank loans to other financial institutions.

Figure 4

in 1990. While the number of banks continued to decline, their combined lending to agriculture is actually increasing, up 4.3 percent in 1990.

During 1990, the agricultural mortgage portfolios of the life insurance companies improved, but the level of stress remained high in terms of historical norms. In 1990, life insurance companies differed in how aggressive they would be in seeking new loans. Some, after lengthy dealings with problem loans, were completely out of the market. Some were offering renewals or increases only on existing good loans. A few companies have even expressed strong interest in rebuilding their depleted agricultural loan portfolios and see agricultural loans as a solid investment for pension fund reserves. At the end of 1990, life insurance companies held an estimated $8.7 billion in agricultural real estate loans for a 12-percent share of the farm real estate loan market.

The remaining participants in agricultural credit (excluding FmHA) are generally classified as individuals and others. This group of participants is believed to be largely made up of individuals who are seller-financing their farmland. This serves as one possible method for providing a retiring farmer with an extended investment and a prolonged income stream from the farm. The downpayment is often less and the interest rate on the balance is usually lower than with regular institutional lenders. At the end of 1990, this group of lenders was estimated to hold 20.3 percent of agricultural real estate loans, or $14.7 billion, and $12.7 billion in non-real-estate loans for a 20.7-percent share.

The Farmers Home Administration (FmHA)

The USDA's FmHA makes loans and grants to farmers and other rural residents who cannot get credit elsewhere for farming, housing, and rural development purposes. In addition, the agency guarantees loans made by other lenders who would not extend credit without a guarantee. More than half of its financial assistance to farmers is now provided in the form of loan guarantees. The agency was created to help farmers and rural residents by making higher risk loans than those considered justifiable by private lenders.

In fiscal 1990, FmHA loans, loan guarantees, and grants totaled $5.7 billion, of which $2.3 billion went to farm loans.

Outstanding FmHA farm loans and loan guarantees totaled $24 billion at the end of fiscal 1990, down from $26.8 billion in 1989.

Farm ownership loans are designed to help farmers buy farms or land or enlarge farms; construct or repair buildings; improve land; and develop, conserve, and make proper use of their land and water resources. The maximum farm ownership loan may not exceed $200,000, although FmHA will guarantee loans as high as $300,000 from other credit sources. The interest rates and repayment terms for guaranteed loans are negotiated between borrowers and lenders, within FmHA guidelines.

Operating loans are extended primarily to help farmers purchase equipment, livestock, feed, seed, and fertilizer; for other farm and home operating needs; to refinance chattel debts; and to carry out forestry and aquaculture projects.

Farm operating loans made by FmHA may not exceed $200,000; but, again, the agency can guarantee loans to farmers from other credit sources as high as $400,000. Loans are to be repaid over a period not exceeding 7 years, but extensions sometimes are granted. Interest rates on direct loans are based on the rate for current Government borrowing.

Youth project loans are made to rural young people between the ages of 10 and 20 years to finance income-producing farm or nonfarm enterprises that are carried out under an organized and supervised program, such as Future Farmers of America.

Reduced interest rates for ownership and operating loans can be made to beginning and other limited-resource farmers for the first 3 years of the loan, if they cannot afford to pay the full cost-of-money rates.

For farm loans guaranteed by the agency, an Interest Rate Reduction Program is available to farmers. In the program, FmHA will reduce interest rates charged on guaranteed loans by up to 4 percentage points.

Low-interest emergency loans are available to eligible farmers and ranchers who have suffered qualifying losses from natural disasters in areas that are named by the President, the Secretary of Agriculture, or the FmHA Administrator as emergency disaster areas. Emergency loans cannot exceed $500,000.

Loans or loan guarantees are made for soil and water conservation facilities. Loans are amortized up to 40 years at an interest rate based on the rate for current Government borrowing or the limited resource rate. Loans are made to Indian tribes to acquire land within a reservation or to Alaska Native communities for tribal use. These loans are repayable in 40 years.

In FmHA's housing programs, interest rates are determined by rates for current Government borrowing, except that low-income households may qualify for rates as low as 1 percent. Loan programs include the following:

(1) Home ownership loans and loan guarantees to purchase, refinance, or improve existing residences; build new houses; and acquire building sites. Maximum term is 33 years, with a possible extension to 38 years in some cases.

(2) Rural rental housing loans to provide rental housing for persons with low or moderate income and for persons age 62 or over. These loans can be coupled with rental assistance payments to reduce rents paid by low-income tenants to no more than 30 percent of their income. Maximum repayment period is 50 years.

(3) Rural housing repair loans or grants to senior citizens with very low income and loans to low-income persons to make repairs and to remove health and safety hazards. Maximum grant is $5,000, maximum loan is $15,000, and maximum loan and grant combination is $20,000. Maximum loan term is 20 years.

(4) Farm labor housing loans to finance low-rent housing for domestic farm laborers. Interest rate is 1 percent and maximum term is 33 years. Grants not exceeding 90 percent of development cost of farm labor housing projects are available under some conditions.

(5) Loans for development of rural homesite areas.

(6) Self-help site development loans and grants to nonprofit organizations providing technical assistance to low-income families building homes by the self-help method.

Community programs provide financial assistance for community facilities, for public use in rural areas and towns of up to 20,000 population, and for water and waste disposal systems in towns of up to 10,000 population. Maximum loan term is 40 years, and the interest rate is based on current market yields of municipal obligations. Development grants may be made to pay up to 75 percent of the cost of constructing water and sewer systems.

Resource conservation and development loans are made in designated areas. These loans cannot exceed $500,000 and are amortized up to 30 years.

Watershed loans are made to finance the local share of costs in projects approved under the Watershed and Flood Prevention Act or in connection with the 11 watershed improvement programs authorized by the Flood Control Act of 1944. They cannot exceed $10 million and are amortized up to 50 years.

The interest rate on these loans is determined by the Secretary of the Treasury at the beginning of the fiscal year.

The business and industrial loan guarantee program provides financial assistance to individuals, public and private organizations, and federally recognized Indian tribal groups for furthering business and industrial development in rural areas. Loans are guaranteed for projects in the open countryside or in towns of up to 50,000 population. Preference is given to towns with fewer than 25,000 people.

Rural Electrification Administration

The Rural Electrification Administration (REA), a credit agency of USDA, makes loans to finance electric and telephone facilities in rural areas.

In fiscal year 1990, REA approved 209 electric and telephone insured loans totaling $860 million. In addition, two guaranteed loans, funded by the Federal Financing Bank (FFB) and totaling $72.4 million, were approved for power supply borrowers.

The Rural Telephone Bank (RTB), an agency of the United States Government located in REA and a supplemental source of financing, approved 25 loans totaling $177 million during the fiscal year.

REA also approved $6.69 million in rural development loans during fiscal year 1990. Approved projects included incubators (or start-up facilities) to attract new businesses and funds for manufacturing plants, industrial operation buildings, a nursing home, and a fire hall. A total of 78 borrowers received interest-free, 10-year loans, which varied from $15,000 to the maximum of $100,000, to promote development and creation of jobs in rural areas.

During the fiscal year, 36 telephone borrowers prepaid a total of $135 million, without premium, of Federal Financing Bank-funded loans in accordance with provisions of 7 CFR 1776.

At the end of fiscal year 1990, REA had eight financially troubled electric borrowers who were in default of debt totaling $2.3 billion. An REA Special Projects Staff, which works on problems of financially troubled borrowers, has negotiated the debt restructuring of more than $6 billion involving seven borrowers.

REA had loaned and guaranteed $62.6 billion to 2,120 borrowers as of the end of fiscal year 1990—since the Electric Program began in 1935 and the Telephone Program in 1949. About $36.8 billion was outstanding on REA direct and FFB-funded loans and $2.5 billion in guaranteed loans as of September 30, 1990. Active borrowers totaled 1,906 (946 electric and 960 telephone). Loans are repaid by borrowers from operating revenues.

An amendment to the Rural Electrification Act in May 1973 established the Rural Electrification and Telephone Revolving Fund (RETRF) in the U.S. Treasury as the primary source of loan funds. It set the standard interest rate for REA (direct) loans at 5 percent and established the RETRF with an interest-free loan of $7.9 billion. In addition, the Revolving Fund has received annual appropriations from Congress for several years.

Money is replenished in the fund through collections on outstanding and future REA loans and from the sale of Certificates of Beneficial Ownership (CBO's) to the U.S. Treasury.

The agency was created as an emergency relief program by Executive Order of the President, then given statutory authority in 1936 when the Rural Electrification Act was passed by Congress and signed by the President. It is headed by an Administrator who is appointed by the President and subject to confirmation by the Senate.

14. THE BALANCE SHEET

Farm asset values including farm households totaled $972.2 billion on December 31, 1989, an increase of nearly 4 percent from the preceding year. Farm debt outstanding decreased in 1989 by 2 percent, totaling $146 billion on December 31, 1989. This was the sixth year that loans outstanding decreased. Increases in assets and decreases in debt in 1989 resulted in a 5-percent increase in equity. This increase in farm equity reflected the improved cash-flow position of some farmers, lower interest rates, and higher returns. On average, farm equity increased nearly $21,500 to $385,500 per farm on December 31, 1989.

The debt-to-asset ratio decreased during 1989, falling from 15.8 to 15.0 percent. During the 1970's, the debt-to-asset ratio was 15 to 17 percent.

The value of farm real estate, which accounts for 70 percent of farm assets, increased by 3 percent during 1989. The per-acre value rose from $669 in 1988 to $694 in 1989. At the end of 1989, the average farm real estate value per farm was $321,000.

Livestock and poultry asset values rose by 6 percent during 1989, while machinery and equipment values rose by 3 percent.

The value of household equipment and furnishings rose by 12 percent between December 31, 1988, and December 31, 1989. The value of financial assets (currency, deposits, and savings bonds) fell 1 percent. The value of crops stored on and off farms rose 2 percent. The value of purchased inputs fell 19 percent during 1989. Farmers' net worth in cooperatives increased 4 percent in 1989.

Farm real estate debt decreased 3 percent to total $80 billion on December 31, 1989. Commercial banks' loans outstanding increased by 8 percent, while farm real estate debt held by the Farm Credit System decreased by 6 percent.

Non-real-estate debt decreased by less than 1 percent to total $65.5 billion on December 31, 1989. Farmers Home Administration (FmHA) loans outstanding fell nearly 16 percent.

Table 10.—Farmers' assets, debts, and equity, 1940, 1960, 1970, 1980, 1985, and 1989[1]

[In billions of dollars]

Item	1940	1960	1970	1980	1985	1989
Assets:						
Real estate	34.0	139.7	224.5	850.1	650.0	688.1
Physical assets other than real estate[2]	15.0	53.1	76.5	198.8	186.5	225.4
Financial	4.7	17.9	23.0	39.3	49.3	258.7
Total	53.7	210.7	324.0	1,088.2	885.8	972.2
Debts:						
Real estate[3]	6.5	12.9	30.5	97.5	105.7	80.5
Nonreal estate[4]	3.3	12.0	22.3	81.2	82.2	65.5
Total[4]	9.8	24.8	52.8	178.7	187.9	146.0
Equity	43.8	185.9	271.3	909.5	697.9	826.3

[1] As of December 31, Includes farm households.

[2] Crop inventory value is value of non-CCC crops held on farms plus value above loan rate for crops held under CCC.

[3] Includes storage and drying facilities loans.

[4] Excludes value of CCC crop loans.

15. FARM INCOME

U.S. farmers earned a total of $104.2 billion in income from farm and off-farm sources in 1989. Their farming operations netted $46.7 billion, after adjusting for changes in commodity inventories, depreciation, and other noncash and household overhead expenses. Income from off-farm sources totaled $57.5 billion in 1989 compared with $57.7 billion in 1988.

Farm operators have earned more than 50 percent of their income from off-farm sources during the last several years. Nearly all farm operator families had some off-farm income, but the smaller the farm, the higher the proportion of off-farm income. Those on farms selling less than $20,000 in farm products per year averaged little, if any, net income from farming. Thus, total family income came from off-farm sources. The largest farm

Table 11.—Income from farming, 1989

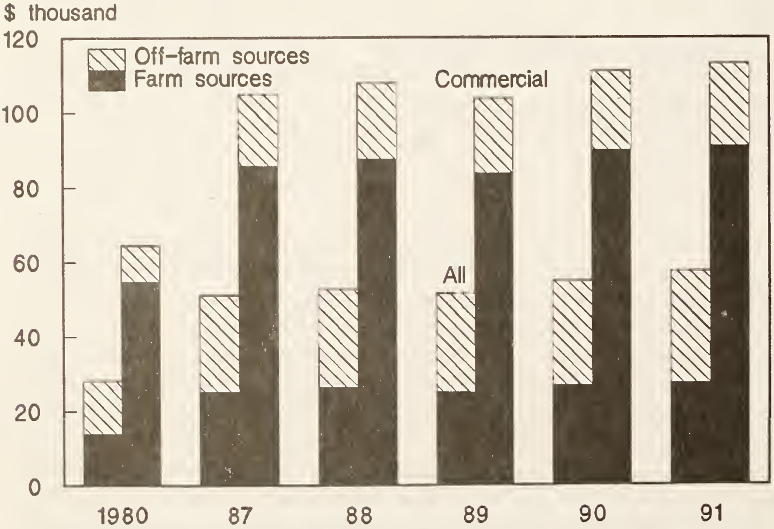
	(Billion dollars)
Cash receipts from farm marketings	159.2
Government payments to farmers	10.9
Farm-related income	7.4
Gross cash income	177.5
Cash production expenses	122.8
Net cash income	54.6
Nonmoney income	7.3
Value of inventory change	4.4
Gross income	189.2
Total farm expenses	142.6
Net farm income after inventory adjustment	46.7

firms, those selling $500,000 or more in farm products per year, averaged about 5 percent of total income from off-farm sources.

Gross cash income from farming in 1989 was $177.5 billion, up 4 percent from 1988. Despite an 8-percent increase in production expenses (to $142.6 billion), and a 25-percent decline in direct Government payments, 1989 net income from farming increased about 12 percent.

Net cash income for 1989 fell, largely due to a 9-percent gain in cash receipts. Direct Government payments fell from $14.5 billion in 1988 to $10.9 billion in 1989. A net addition of $4.4 billion into inventories raised farmer-owned stock.

Net cash income per farm



1990 preliminary. 1991 forecast. Commercial farms = sales of $40,000 or more.

Figure 5

The volume of farm output in 1988 fell as drought conditions reduced harvests of major crops. Prices farmers received for their products were higher in 1988 than a year earlier. Prices for livestock and livestock products rose less than crop prices.

Receipts from marketing of livestock and products were up $4.9 billion while crop sales rose $4.1 billion in 1989. The combined total of $159.2 billion was 6 percent above 1988. Ranked on the basis of total cash receipts from farm marketings in 1989, California was first with $17.5 billion, Texas second with $10.8 billion, and Iowa third with $9.1 billion.

The other 7 States in the top 10 (in order of cash receipts from marketings) were Nebraska, Illinois, Minnesota, Kansas, Florida, Wisconsin, and North Carolina.

The Northern Plains and Midwestern States rebounded in 1989 from a severe regional drought in 1988. Net farm income in both the Corn Belt and Lake States increased on average more than 25 percent, with many States showing increases of more than 50 percent. Indiana and Montana had increases in excess of 100 percent.

Changes in net farm income between 1988 and 1989 varied among States. Thirty-three States had increases in net farm income. The average increase was over 22 percent. The average decrease in net farm income among the other 17 States was 12 percent. The recovery from the effects of the 1988 drought in the Midwest (Corn Belt, Lake States, and Northern Plains), where feed grain production is centered, was pronounced.

No common cause for the States incurring the largest percentage declines in net farm income was easily discernible. Wyoming's and West Virginia's net farm income fell by over 30 percent from 1988 to 1989. Alaska, Kansas, and New Hampshire also suffered substantial declines.

USDA has been publishing a comprehensive set of income estimates relating to agriculture since the mid-1920's. Economists develop data on gross farm income, farm production expenses, and the net return to farm operators for their farm work, including that of their families; for their management; and for the capital invested in their farms and equipment.

Cash receipt estimates are on a commodity-by-commodity basis, the result of the use of detailed monthly price and marketing estimates provided by State offices to the National Agricultural Statistics Service (NASS). The expense estimates are based primarily on Census of Agriculture benchmarks, with yearly movements derived from special surveys, particularly the Farm Costs and Returns Survey, and NASS estimates of prices paid by farmers.

Gross farm income includes five principal components:

1. Cash receipts from farm marketings of farm products include gross receipts from commercial market sales, as well as loans placed with the Commodity Credit Corporation (CCC), and profits (if any) realized from redemption of commodities previously placed with CCC.
2. Government payments are those made directly to farmers in connection with farm programs.
3. Farm-related income derives from alternative uses of farmer-owned resources, such as recreation, machine hire, and custom work.
4. Nonmoney income refers to the value of farm products produced and

consumed by farm households and housing provided by farm dwellings. Expenses associated with these products and dwellings are accounted for in production expense estimates.

5. Value of inventory change is the difference between beginning and ending quantities multiplied by the calendar-year average price of each commodity.

The value of inventory change is the value of additions to or reductions of (net sales) farmer-owned inventories. Additions represent product not yet sold. Reductions are sales of commodities produced and accounted for in previous years.

Production expense summarizes the total costs incurred to produce farm commodities. They include current farm operating expenses for such items as the wages of hired labor (in cash and in kind) and outlays for repairs of equipment and buildings, as well as purchase of fuels, chemicals, feed, seed, and livestock.

Overhead costs include charges for depreciation and accidental damage, taxes on farm property, and interest on the farm mortgage debt.

Purchases of new buildings, motor vehicles, and other capital equipment are not included as a production cost. Instead, production expenses include an allowance for annual depreciation. Estimates of depreciation are based on replacement cost, which is the current market value of buildings and equipment. Thus, after a period of substantial price increase, as occurred after World War II, depreciation charges estimated on a replacement cost basis are larger than if on an original cost basis.

Net farm income after inventory adjustment equals gross income, plus inventory change, minus production expenses. After adjustments for corporate salaries and profits, it is referred to as farm proprietors' income, and included in the national income estimates reported by the U.S. Department of Commerce.

Net farm income measures the income generated by agricultural production in a given calendar year. It is an approximation of the net value of agricultural production, regardless of whether the commodities were sold, fed, or placed in inventory during the year. Unlike net cash income, this series includes farm household benefits and expenses.

Net cash income from farming measures the total income that farmers choose to receive in a given calendar year, regardless of the amount of production or the year the marketed output was produced. It approximates the income available to farmers for purchasing assets, such as land or machinery; retiring loans; and purchasing other goods and services, including those for operating the farm household. It is the difference between the gross cash income received (cash receipts, Government payments, and farm related income) minus the cash expenses incurred during a calendar year.

16. FARM PRODUCTION ADJUSTMENTS

The Food Security Act of 1985 authorized programs to protect farmers' incomes through target prices for wheat, feed grains (corn, sorghum, oats, and, if designated, barley), cotton, and rice. The programs, administered by the Agricultural Stabilization and Conservation Service (ASCS), also provide measures aimed at assuring an adequate supply of food and fiber at reasonable prices.

The 1985 act continued the authority for the Secretary of Agriculture to establish an acreage reduction program for any of the crops or a set-aside program, if the Secretary determines that the total supply would be excessive in the absence of such an acreage reduction program.

Acreage reduction programs were implemented in 1990 for the ninth consecutive year. The acreage reduction is achieved by applying a uniform reduction percentage to each participating farm's acreage base for a specific crop. This acreage base is determined from the history of the crops planted or considered planted on the farm.

The acreage removed from production (the Acreage Conservation Reserve) must be devoted to conservation use measures sufficient to protect the land from weeds, and from wind or water erosion.

The act also authorizes a voluntary paid land diversion for producers of rice, feed grains, cotton, and wheat if the Secretary determines that such adjustment is necessary to reduce production. Acreage removed from production under this program must also be devoted to a conservation use.

For peanuts and most kinds of tobacco, earlier legislation provided for marketing quotas. The Secretary of Agriculture must proclaim these quotas when supply prospects exceed specified levels. If approved by two-thirds or more of the producers of each commodity voting in a referendum, the marketing quotas become mandatory for all producers of that commodity, and price support also becomes mandatory.

Tobacco program amendments enacted in April 1986 provide for growers and buyers to share equally the assessments to operate the price support and production adjustment program, at no net cost to the taxpayer other than the administrative expenses common to the operation of all price support programs. The poundage quotas for flue-cured and burley tobaccos are arrived at after considering (1) the purchase intentions of domestic cigarette manufacturers, (2) the 3-year average of exports, and (3) the producer association inventory adjustment. The quotas are to equal these three factors. The Secretary of Agriculture has limited discretion to modify the quotas (plus or minus 3 percent).

The peanut program features a two-tier price support system and poundage quotas. Acreage allotments remain suspended for the 1986-90 crops. The poundage quota is the quantity estimated to be devoted to domestic edible peanuts, seed, and related use.

Price support will be available on peanuts produced within the poundage quota (quota peanuts) at the higher domestic edible peanut support rate. The quota support rate for 1990 was $631.47 per ton, and the figure is adjusted up any year in which there is an increase in production costs.

Anyone can grow and contract additional peanuts for export or domestic crush. Additional peanuts are supported at levels taking into account world market prices and potential losses to the Government. For 1990, this rate was $149.75 per ton.

17. INCOME AND PRICE SUPPORT PROGRAMS

Producers complying with the announced farm programs are eligible for Commodity Credit Corporation (CCC) loans and purchases, target price protection (deficiency payments), and land diversion payments when applicable.

The target price is designed to provide income support for producers when market prices are below the target levels. The payment is based on a rate by which the target price exceeds the larger of the national weighted average market price or the national price-support loan rate for the crop. The farm payment is determined by multiplying the rate times the product of the planted acreage within the permitted and the established yield on a farm.

Price support to farmers is provided through commodity loans or other means for food grains (wheat, rice, and rye); feed grains (corn, sorghum, barley, and oats); oil crops (soybeans, oilseeds, and peanuts); fibers (wool, mohair, and cotton); milk; tobacco; honey; sugar beets, and sugarcane.

The loan programs are financed by the CCC and administered by USDA's Agricultural Stabilization and Conservation Service (ASCS).

Price support assistance for wheat, rice, feed grains, cotton, peanuts, and tobacco is usually contingent upon participation by the farmer in applicable annual programs. The assistance to participating farmers is provided at preannounced levels set within statutory guidelines. Methods include loans on crops held in storage by farmers, market purchases in times of excess supply, and supplemental payments to wool and mohair producers.

Loans on eligible commodities are made to producers through ASCS county offices and approved cooperatives. The loans are "nonrecourse"; i.e., if market prices rise above the loan level, the producer can pay off the loan with interest and sell the crop on the market.

If prices fall below the loan level, the producer can turn the commodity over to the CCC in full payment of the loan. Price support on tobacco and peanuts is made through producer associations acting for individual producers. Price support to sugar beet and sugarcane producers is provided through loans to eligible sugar processors.

The Food Security Act of 1985 mandated new market enhancement plans (marketing loans) for cotton and rice to make those commodities more competitive in the world market. The act allowed a producer to repay price support loans at less than the loan rate when world prices are below the basic loan rate.

The 1985 act also authorized marketing loans for wheat, feed grains, minor oilseeds, and soybeans, if the Secretary determines they are necessary to maintain those grains' competitiveness in domestic and world markets.

It also authorized a lower loan payment option for any of the 1986-90 crops of honey. Under this provision, producers with price support loans for any crop year during which the option is in effect are permitted to repay their loans at the lesser of the loan level or a level which the Secretary determines will both minimize Government expenditures and maintain the competitiveness of U.S. honey in domestic and export markets. The Secretary of Agriculture can implement this provision at his or her discretion.

Milk prices are supported by the buying of excess market supplies of milk in the form of cheese, butter, and nonfat dry milk from processors.

The total amount of deficiency and diversion payments a person may receive under one or more of the annual programs for wheat, feed grains, cotton, and rice is limited to $50,000. This limitation does not apply to CCC purchases, loans, or payments resulting from reducing the basic loan rate.

Some of the program payments to producers are paid partially with CCC commodity certificates. The majority of commodity certificates are generic and can be exchanged by producers for cash or for commodities under loan to or owned by the CCC. The certificates are also negotiable and can be sold to another producer or to a commercial entity.

18. GRAIN RESERVE PROGRAM

The Food Security Act of 1985 reauthorized the Grain Reserve Program for farmer-owned wheat, corn, grain sorghum, oats, and barley. When entry into the grain reserve program is authorized by the Secretary of Agriculture, producers may enter into a contract extending their loan for an additional 3 years and receive annual storage payments.

Interest is charged during the first year of the agreement. The loans cannot be repaid with cash without penalty until the national average market price for the commodity reaches the trigger release level set by the 1985 act. The matured reserve loan may be extended an additional 3 years if authorized by the Secretary.

Producers with maturing reserve loans may also enter the loan collateral into the special producer storage loan program if authorized by the Secretary. Under the special producer storage loan program, producers enter into a 1-year contract and receive storage payments at the same rates being earned under the reserve program. The loans may be repaid any time during the 1-year period. If authorized by the Secretary, the loan may be extended.

The Farm Facility Loan Program helps qualifying producers obtain needed onfarm storage for their crops. Applications for these loans are accepted by county ASCS offices only during periods announced by the Secretary of Agriculture.

19. EMERGENCY LIVESTOCK FEED

In emergencies caused by natural disasters, USDA provides feed assistance to livestock producers through programs administered by the Agricultural Stabilization and Conservation Service (ASCS).

These feed programs provide for the sale of CCC-owned grain or for cost-share assistance to livestock producers for the cost of purchasing feed, including hay, in approved counties.

Eligible livestock producers must have insufficient feed available to preserve and maintain their eligible livestock.

To provide additional forage for livestock in emergencies, USDA can also allow haying and grazing on acreage diverted to conserving uses under the production adjustment programs.

20. BEES AND HONEY

The Nation has about 2,000 commercial beekeepers (those owning 300 or more colonies of bees), 10,000 part-time beekeepers, and 200,000 hobbyist beekeepers. The 1990 survey of U.S. beekeepers by USDA's National Agricultural Statistics Service indicated about 3.2 million colonies were managed by beekeepers with 5 or more colonies. Some beekeepers migrate with their bees thousands of miles each year to provide pollination services to important agricultural crops.

As worker bees fly from flower to flower, gathering pollen and nectar, pollen sticks to their body hair and is transferred from blossom to blossom, effectively pollinating the flowers. Some plants are dependent on this process for fertilization; in others, the additional pollination by bees and other insects boosts fertilization and crop production.

U.S. honey production averaged 240 million pounds annually in the 1950's and 1960's, 211 million pounds in the 1970's, and 195 million pounds in the 1980's. However, if the weather-reduced crops of 1984, 1985, and 1989 are excluded, honey production averaged 209 million pounds for the 1980-89 period.

The value of U.S. honey production in 1990 was $105 million, up from $89.4 million in 1989. Honeybees also produce 3.5-4 million pounds of beeswax each year and several lesser known substances such as bee pollen, bee venom, and royal jelly, important ingredients in a variety of products.

The value of honeybees as pollinators far exceeds the value of the honey and beeswax produced. However, for most beekeepers the receipts from honey and beeswax are much greater than the fees received for pollination services. A study focusing on the 1985 crop year estimated that the value of increased yield and quality of 49 major crops achieved through pollination by honeybees was about $9.3 billion.

About one-third of the human diet is affected by honeybee pollination. Foods involved include many types of fruits, vegetables, melons, berries, and nuts. Other plants pollinated by honeybees contribute indirectly to human diets because they are important food sources for livestock and wildlife. These include alfalfa, clover, and wild fruits.

Bees have numerous enemies, including humans, competing for the honey, pollen, and beeswax a colony produces for its survival. Honeybees protect their nests by the only means they have—their stings.

The Government honey program was created 40 years ago to provide market price stability for honey producers to encourage them to maintain a sufficient honeybee population to pollinate crops.

In the early 1980's, U.S. honey support prices moved above the average domestic price and producers began to find it profitable to forfeit their honey to the Government. At the same time, packers and food manufacturers found it economical to import lower priced honey for domestic use. Most of the forfeited honey was distributed through Federal food programs.

In the Food Security Act of 1985, the honey program was changed to make domestic honey more competitive with imports. This reduced forfeitures to the Government. About $526 million was spent by the Government on the honey price support program from 1980 to 1988.

Important current issues to the U.S. beekeeping industry, which are likely to affect its structure in the next few years, include diseases and parasites, herbicides and pesticides, honey imports, price support policy, and Africanized honeybees.

One swarm of Africanized honeybees entered the United States from Mexico in 1990. They were the first descendents of Africanized honeybees to migrate northward into the United States from ancestors that escaped into the Brazilian countryside in the late 1950's and interbred with the more docile European bees. Those original African bees had been imported into Brazil by scientists seeking to breed a bee better suited to tropical countries than the European bees then existing in both South and North America.

One concern of beekeepers is that Africanized bees defend their nests more aggressively than European bees, making them more difficult to manage. They also swarm more often and grow to adults more quickly, which means they can gain a population advantage over other bees.

The venom of an Africanized honeybee is no more potent than that of a European honeybee, and the Africanized bee is actually minutely smaller than its European counterpart. Mass stinging attacks are terrifying and can be life-threatening, but they are not common.

Some exaggerated reports of Africanized honeybee attacks resulted in the bees' being characterized as "killer bees" in some media reports and several movies.

USDA researchers are concerned that U.S. beekeepers' losses could be substantial if the behavior of the Africanized honeybees in this country is similar to that in South and Central America. In some areas of South America, beekeeping and honey production declined sharply when as many as 80 percent of the amateur beekeepers and 20 percent of the commercial beekeepers abandoned their hives because the new strains of bees were more difficult to work with.

The problem traits and actions of the Africanized honeybees in some parts of the world include defensive behavior, excessive swarming, and nesting in a wide variety of locations. Scientists are working to reduce or eliminate these problem traits before Africanized honeybees are established in the United States.

III. THE FARMING OPERATION

21. FARMING REGIONS

The 10 major farming regions in the United States differ in soils, slope of land, climate, distance to market, and storage and marketing facilities. Together they comprise the agricultural face of the Nation.

The Northeastern States—from Maine to Maryland—and the Lake States—the northern tier of States bordering on the Great Lakes from Michigan to Minnesota—are the Nation's principal milk-producing areas.

Climate and soil in these States are suited to raising grains and forage for cattle and for providing pastureland for grazing.

Broiler farming is important in Maine, Delaware, and Maryland. Fruit and vegetables also are important to the region.

The Appalachian region—Virginia, West Virginia, North Carolina, Kentucky, and Tennessee—is the major tobacco-producing region in the Nation. Peanuts, cattle, and dairy production are also important.

Farther south along the Atlantic is the Southeast region. Beef and broilers are important livestock products. Fruits, vegetables, and peanuts are grown in this region. And, of course, there are big citrus groves and winter vegetable production areas in Florida.

In the Delta States—Mississippi, Louisiana, and Arkansas—the principal cash crops are soybeans and cotton. Rice and sugarcane are also grown. With improved pastures, livestock production has gained in importance. This is a major broiler-producing region.

The Corn Belt, extending from Ohio through Iowa, has rich soil, good climate, and sufficient rainfall for excellent farming. Corn, beef cattle, hogs, and dairy products are the major outputs of farms in the region. Other feed grains, soybeans, and wheat are also important.

Agriculture in the northern and southern Plains, which extend north and south from Canada to Mexico and from the Corn Belt into the Mountain States, is restricted by rainfall in the western portion and by cold winters and short growing seasons in the northern part.

About three-fifths of the Nation's winter and spring wheat is produced in this region. Other small grains, grain sorghum, hay, forage crops, and pastures form the basis for raising cattle. Cotton is produced in the southern part.

The Mountain States—from Idaho and Montana to New Mexico and Arizona—provide a still different terrain. Vast areas of this region are suited to raising cattle and sheep. Wheat is important in the northern parts. Irrigation in the valleys provides water for such crops as hay, sugar beets, potatoes, fruits, and vegetables.

The Pacific region includes the three Pacific Coast States plus Alaska and Hawaii. Farmers in Washington and Oregon specialize in raising wheat, fruit, and potatoes; vegetables and fruit and cotton are important in

California. Cattle are raised throughout the entire region. In Hawaii, sugarcane and pineapples are the major crops.

22. FARMS AND LAND IN FARMS

The United States had 2,172,920 farms in 1989, down 1.1 percent from the 2.2 million in 1988 and 11 percent from the 2.43 million in 1981. The number of farms declined from 1 to 3 percent per year from 1981 through 1989. This decline continues the downward trend started in 1936.

Land in farms continues to decline slowly, with the total of 991 million acres in 1989, down 0.3 percent from a year earlier and down 4.1 percent from 1981. Land in farms has declined every year since reaching its peak at 1.206 billion acres in 1954. Some of the loss results from urbanization and highway construction.

Since the number of farms declined at a faster rate than land in farms, the average size of farms increased from 424 acres in 1981 to 456 acres in 1989.

23. FARMS BY SALES CLASSES

More than nine-tenths of all farm products going to market are produced on farms with gross sales of $20,000 or more per year. This upper income group of 894,000 farms in 1988 makes up most of the commercial agricultural economy of the United States. The operators of these farms do the buying and selling that turn the wheels of an enormous agricultural business and food and fiber marketing complex.

Farms selling products valued at $100,000 or more represented about 14.7 percent of total farm numbers in 1988. Their net income before inventory adjustment averaged $131,537 in 1988. In the aggregate they received 85 percent of the net income received from farming. The proportion of these larger farms has changed little in recent years.

Farms selling $40,000 to $99,999 worth of agricultural products in 1988—14.6 percent of all farms—received 11.2 percent of 1988 net farm income. The proportion of farms with annual sales between $40,000 and $100,000 was stable during 1987 and 1988.

Farms with sales of $20,000 to $39,999 made up 11.4 percent of all farms and had average net farm income of $6,570 in 1988.

These top sales classes accounted for $157.12 billion in cash receipts (including direct Government payments) of the $165.91 billion for all farms in 1988. The top sales groups comprised 41 percent of all farms and accounted for 94.7 percent of the cash receipts in 1988.

More recently, the proportion of farms in the $10,000 to $39,999 range has risen slightly, while the percentage of small farms, those with sales less than $10,000, declined. The small farms account for only 11 percent of total land in farms. In contrast, the farms with sales over $100,000 account for nearly half of the total farmland.

The average size of small farms fell slightly between 1987 and 1989. Farms with sales from $10,000 to $39,999 increased in size in 1987, then

Table 12.—States ranked by cash receipts (including net Commodity Credit Corporation loans), 1989

[In millions of dollars]

State	Total	Livestock and livestock products	Crops	The four leading commodities ranked by cash receipts			
				1.	2.	3.	4.
Alabama	2,628	1,932	696	Broilers	Cattle/calf	Grnhs/nurs	Peanuts
Alaska	29	9	20	Grnhs/nurs	Dairy prods	Potatoes	Cattle/calf
Arizona	1,902	744	1,158	Cotton	Cattle/calf	Dairy prods	Lettuce
Arkansas	4,131	2,661	1,470	Broilers	Soybeans	Cattle/calf	Rice
California	17,515	5,093	12,422	Dairy prods	Grnhs/nurs	Grapes	Cattle/calf
Colorado	3,899	2,649	1,250	Cattle/calf	Corn	Wheat	Dairy prods
Connecticut	404	186	218	Grnhs/nurs	Eggs	Dairy prods	Tobacco
Delaware	663	503	160	Broilers	Soybeans	Grnhs/nurs	Corn
Florida	6,203	1,221	4,982	Oranges	Grnhs/nurs	Tomatoes	Cane/sugar
Georgia	3,869	2,270	1,598	Broilers	Peanuts	Eggs	Cattle/calf
Hawaii	587	92	495	Cane/sugar	Pineapples	Grnhs/nurs	Macad.nuts
Idaho	2,715	1,046	1,670	Cattle/calf	Potatoes	Wheat	Dairy prods
Illinois	6,710	2,252	4,458	Corn	Soybeans	Hogs	Cattle/calf
Indiana	4,318	1,817	2,502	Corn	Soybeans	Hogs	Cattle/calf
Iowa	9,119	5,209	3,911	Hogs	Cattle/calf	Corn	Soybeans
Kansas	6,324	4,245	2,079	Cattle/calf	Wheat	Sorghum	Corn
Kentucky	2,928	1,670	1,258	Tobacco	Cattle/calf	Horses/mule	Dairy prods
Louisiana	1,661	614	1,048	Cotton	Soybeans	Cane/sugar	Cattle/calf
Maine	447	215	233	Potatoes	Eggs	Dairy prods	Apples
Maryland	1,346	870	476	Broilers	Dairy prods	Grnhs/nurs	Soybeans
Massachusetts	429	112	317	Grnhs/nurs	Cranberries	Dairy prods	Eggs
Michigan	2,941	1,313	1,627	Dairy prods	Cattle/calf	Corn	Grnhs/nurs
Minnesota	6,526	3,716	2,809	Dairy prods	Cattle/calf	Soybeans	Hogs
Mississippi	2,292	1,292	1,000	Broilers	Cotton	Soybeans	Cattle/calf
Missouri	3,900	2,168	1,732	Cattle/calf	Soybeans	Hogs	Dairy prods
Montana	1,610	899	710	Cattle/calf	Wheat	Hay	Barley
Nebraska	8,521	5,643	2,878	Cattle/calf	Corn	Hogs	Soybeans
Nevada	235	141	94	Cattle/calf	Hay	Dairy prods	Potatoes
New Hampshire	142	63	9	Dairy prods	Grnhs/nurs	Apples	Cattle/calf
New Jersey	660	197	463	Grnhs/nurs	Dairy prods	Eggs	Blueberries

Table 12.—States ranked by cash receipts (including net Commodity Credit Corporation loans), 1989[1]—Continued

[In millions of dollars]

State	Total	Livestock and livestock products	Crops	The four leading commodities ranked by cash receipts			
				1.	2.	3.	4.
New Mexico	1,424	974	450	Cattle/calf	Dairy prods	Hay	Cotton
New York	2,857	1,946	911	Dairy prods	Grnhs/nurs	Cattle/calf	Apples
North Carolina	4,551	2,505	2,046	Tobacco	Broilers	Hogs	Turkeys
North Dakota	2,108	642	1,465	Wheat	Cattle/calf	Barley	Sunflowers
Ohio	3,812	1,698	2,114	Soybeans	Dairy prods	Corn	Cattle/calf
Oklahoma	3,594	2,409	1,185	Cattle/calf	Wheat	Grnhs/nurs	Broilers
Oregon	2,297	739	1,557	Cattle/calf	Grnhs/nurs	Wheat	Dairy prods
Pennsylvania	3,581	2,595	986	Dairy prods	Cattle/calf	Grnhs/nurs	Eggs
Rhode Island	79	13	66	Grnhs/nurs	Dairy prods	Eggs	Potatoes
South Carolina	1,225	551	675	Tobacco	Cattle/calf	Soybeans	Broilers
South Dakota	2,992	2,108	884	Cattle/calf	Hogs	Soybeans	Wheat
Tennessee	1,921	1,060	861	Cattle/calf	Dairy prods	Soybeans	Hogs
Texas	10,760	6,863	3,897	Cattle/calf	Cotton	Dairy prods	Broilers
Utah	748	574	174	Cattle/calf	Dairy prods	Hay	Turkeys
Vermont	426	375	51	Dairy prods	Cattle/calf	Hay	Maple prods
Virginia	2,058	1,372	685	Cattle/calf	Broilers	Dairy prods	Tobacco
Washington	3,639	1,201	2,438	Dairy prods	Wheat	Apples	Cattle/calf
West Virginia	314	250	64	Cattle/calf	Broilers	Dairy prods	Turkeys
Wisconsin	5,278	4,337	941	Dairy prods	Cattle/calf	Hogs	Corn
Wyoming	856	669	186	Cattle/calf	Hay	Sugarbeets	Sheep & lamb
United States	159,174	83,723	75,449				

Table 13.—Number of farms and land in farms, United States, June 1, 1981-90

Year	Number of farms	Acres of land in farms	Average size of farms
	Thousands	Thousands	Acres
1981	2,440	1,034,190	424
1982	2,407	1,027,795	427
1983	2,379	1,023,425	430
1984	2,334	1,017,803	436
1985	2,292	1,012,073	441
1986	2,250	1,005,333	447
1987	2,213	998,923	451
1988	2,197	994,543	453
1989	2,171	991,153	457
1990	2,143	987,721	461

Table 14.—Percent of farms, land in farms, and average size, by sales class, United States, June 1, 1989-90

Economic class gross value of sales	Percent of total				Average size of farms	
	Farms		Land			
	1989	1990	1989	1990	1989	1990
$ 1,000-$ 2,499	22.7	22.2	3.1	3.0	62	62
$ 2,500-$ 4,999	13.8	13.7	3.1	3.1	103	104
$ 5,000-$ 9,999	11.8	11.7	4.5	4.1	174	162
$ 10,000-$ 19,999	10.7	11.1	6.0	6.3	256	262
$ 20,000-$ 39,999	12.2	12.1	11.7	10.8	438	411
$ 40,000-$ 99,999	14.5	14.4	23.1	23.2	727	743
$100,000-$249,999	9.6	10.0	24.5	226.0	1,165	1,198
$250,000+	4.7	4.8	24.0	23.5	2,332	2,256
Total	100.0	100.0	100.0	100.0	457	461

fell the next year. The size of those with sales between $40,000 and $100,000 fell in 1987 and increased in 1988. Farms with sales greater than $100,000 generally decreased in size in 1987 and 1988.

24. FAMILY-CONTROLLED FARMING

A family-controlled farm business is much like any other business in which an individual or several members of a family own part or all of the assets and make most of the business decisions. Unlike the business organizations in which management is hired by stockholders, most farm businesses are closely held; ownership and management are not separated.

Family businesses, whether engaged in farming or some other business activity, can be organized in three different ways. The most common is the sole proprietorship. In this form of business organization, an individual or a married couple is responsible for operating the business. Of all farms reported in the 1987 Census of Agriculture, 87 percent were sole proprietorships.

The partnership is the next most important form of business organization for farm businesses. About 10 percent of the farms were such businesses. Typically, partnerships include a parent and one or more children or other close relatives. Each member of the partnership shares in earnings or losses in proportion to his or her contribution. Farm businesses organized as partnerships tend to be larger than sole proprietorships because the resources of several individuals can be combined, and additional labor and management are provided by the partners.

The third form of business organization is the corporation, which has a legal identity apart from its shareholders. Any business can be incorporated under the laws of the State in which the organizers choose to file articles of incorporation.

Because it is a separate legal entity, it can conduct business in the name of the firm, provide limited liability to its stockholders, and continue to exist even though one or more shareholders may die. Shares in the business may be transferred by sale or gift, and a different set of tax laws applies than the laws for sole proprietorships and partnerships. According to the 1987 Census of Agriculture, there were 66,969 farms operated by corporations. These accounted for about 3 percent of all farms.

Most farming corporations reported in the census (60,771) were held by families, meaning that the majority of stock is held by members of a single family or close relatives.

The remainder (6,198) of corporate farms were nonfamily corporations. The stock of most of these nonfamily corporate farms is closely held by small groups of nonrelated persons, but the stock of some of them is widely held and traded on the over-the-counter market or on organized stock exchanges. A few of the nonfamily corporate farms are owned by nonfarm corporations. Sales of these nonfamily corporate farms came mostly from fed cattle, poultry, and fruits and vegetables.

25. LAND TENURE

Land tenure describes the relationship of the farm operator to the land operated. The major land tenure categories in this country are (1) full owners, who own all of the land they operate; (2) part owners, who own and rent land they operate; and (3) tenants, who rent all of the land they operate.

The Census of Agriculture reports that in 1987 approximately 2,087,759 farmers worked about 964 million acres of land in farms. Full owners (59.3 percent of all farm operators) operated 317.8 million acres.

Part owners (29.2 percent of all farm operators) worked 519.8 million acres.

Tenant operators (11.5 percent of all farm operators) operated about 126.9 million acres.

The number of farm operators has been declining since it peaked at

6,812,350 in 1935. This trend is continuing, but the decline in recent years does not appear to be as precipitous as in earlier years. Part owners are becoming more important as a tenure class as measured by an increasing proportion of the number of farms, acres in farms, and value of products sold. Despite a considerable decline in the number of farms and shifting proportions among the tenure classes, farm operators as a whole own about 60 percent and rent about 40 percent of the land they handle.

Various arrangements are available for leasing agricultural land. Cash leases and share leases are the predominant lease types, accounting for 94 percent of all leases and acres leased. Under cash leasing, a fixed cash payment is paid to the landowner for the use of the land. Most farming decisions are then made by the tenant. While under a pure cash lease the operator assumes all the risk, some cash leases provide for adjustments in payment for unusual or exceptional circumstances such as adverse weather damage.

Under a share lease arrangement the renter pays a specified share of the crop (or livestock) to the landowner, thereby sharing the risk. The shares depend on renters' and landowners' respective contributions to operating expenses and production, and other factors such as local custom. Variable costs of production often are shared in the same proportion as output.

Under a cash lease, the renter pays a fixed dollar amount for the use of the land. The renter usually pays for all operating expenses and keeps all the output produced. The landowner typically pays the real estate taxes and maintains the buildings. Under a share lease the landowner typically pays for a portion of the seed, fertilizer, and other production expenses, and receives a corresponding share of the output.

26. FARMLAND OWNERSHIP

The 1988 Agricultural Economics and Land Ownership Survey (AELOS) by the Census of Agriculture reported 2,952,282 private owners of agricultural land, of whom 1,655,716 were farm operators and 1,296,566 were nonoperators.

According to AELOS, of the 833,157,000 privately owned acres in farms, 494,737,000 acres are owned by farm operators, and 299,276,000 are owned by nonoperators. These nonoperators own an additional 39,144,000 acres of land not in farms.

Of the 833 million acres of privately held land, 332 million acres (40 percent) were rented to farm operators. Ninety percent of that private rented land in farms is owned by nonfarmers.

AELOS accounted for, but did not report detail on, the ownership of "public" lands (government, Indian reservation, railroad), an additional 54 million acres—almost entirely grazing land in farms.

Over 82 percent of the farmland was owned by sole proprietors, husbands and wives, or partnerships. About 15 percent of the land was held by corporations, 63 percent of which are family corporations.

Farmland ownership was concentrated in the hands of older people. Nearly 40 percent of the noncorporate owned land was held by persons over 65, and only 4 percent by persons under 35.

According to the 1987 Census of Agriculture, farm operators are overwhelmingly male. But the 1987 Census of Agriculture questionnaires do not provide for husband/wife teams. In AELOS, where landlords were permitted to report male, female, and joint ownership, women predominate. Landlords are 31 percent male, 40 percent female, and 29 percent joint owners. They own, respectively, 28, 37, and 35 percent of the land.

Ninety-eight percent of owners, owning over 98 percent of noncorporate and noninstitutional farmland, identified themselves as white and non-Hispanic. Blacks and Hispanics each held less than 1 percent of the noncorporate and noninstitutional farmland, with other minority groups holding even smaller shares.

In 1988, the largest 4 percent of owners held 47 percent of all privately owned agricultural land. Concentration among owners does not appear to have increased significantly since 1946, although the number of owners of farmland has declined from 5 million to 3 million. In the same period, the number of farms dropped from nearly 6 million to slightly more than 2 million.

Foreign persons, including corporations, partnerships, and other legal entities, are required under the Agricultural Foreign Investment Disclosure Act to report their holdings of U.S. agricultural land.

Summarization of the reports under the act confirms that, at the end of 1989, slightly less than 1 percent of the farmland was owned by foreigners. Forest land accounts for 50 percent of this foreign-owned acreage. Although some local areas may be noticeably affected by foreign ownership, the total acreage of about 13 million acres is so small nationally that the aggregate effect is insignificant.

27. CONTRACT FARMING AND VERTICAL INTEGRATION

A contract to produce and deliver a farm commodity is basically similar to the contractual arrangements that are widely used in industry.

One firm—in this case, a farmer—agrees to plant, care for, and deliver the production from a given acreage of peas to the canning plant. Or the producer agrees to care for a specified number of broilers, hens, or turkeys and turn over the birds or eggs to the processing or marketing firm.

The contractor may specify the variety of seed to be used, the particular strain of broilers or laying hens, the kind of fertilizer or feed to be used, and other specific practices the producer must follow.

The contractor may go even further and provide all the inputs needed and assure the producer a guaranteed minimum for operator labor and use of buildings and equipment.

Contracts involving farm products can range all the way from the preceding type of contract to one in which the farmer simply agrees in advance to sell a certain amount of a product to a particular buyer. The price may be determined in advance or it may be based upon a formula that takes into account the going market price at the time of delivery.

A high percentage of the production of broilers, eggs, turkeys, sugar beets, fruits, and vegetables has long been involved in various kinds of contractual arrangements.

In recent years the technique has been applied to cattle feeding, hog production, and certain feed crops and forage. Commercial feedlots will feed out the calves raised by cattle farmers; a feed manufacturer will make contracts with local farmers to produce feeder pigs or to raise market hogs.

Commercial feedlots often contract with nearby farmers to raise forage needed in the feedlot or to deliver feed grains on a regular schedule.

Each party to a contract is seeking some advantage in the arrangement. The producer often receives technical advice, financing for the production period, and assurance of a market outlet. The contractor hopes to get a product that better meets the contractor's requirements for processing and marketing and that is delivered on a schedule that will permit more efficient use of the contractor's plant and labor.

Vertical integration is an alternative to contracts. It is used by input suppliers and processors to achieve control of two or more stages in the production and processing of food products.

Broiler processing firms that own hatcheries and feed mills and that engage in direct production (rather than production by contracts) are prime examples of a vertically integrated food system.

Canning companies that produce a portion of their crop requirements and cattle feeders that also own slaughter plants are other common examples.

Overall, the extent of contract production and vertical integration increased substantially between 1970 and 1980. About 22 percent of total farm production in 1970 was estimated to have been conducted under both forms of coordination, and the proportion increased to about 30 percent by 1980. Contract production increased from 17 to 23 percent and vertical integration from about 5 to 7 percent.

Sharpest increases in both contracting and vertical integration occurred for eggs and turkeys in the livestock sector, and in contracting for cotton, grains, oilseeds, and citrus and noncitrus fruits.

The major change in contract farming since 1970 has been a sharp increase in farmers' use of forward sales contracts in marketing cash grains, oilseeds, and cotton.

28. RISE OF U.S. PRODUCTION

Farmers in the United States produce 3.5 times more per work-hour than in 1960 and over 8.2 times as much as in 1947.

Although large acreages were held out of crop production between 1960 and 1970, total U.S. farm output increased nearly as fast as the U.S. population. During most of the 1970's, acreage was restored to production and output increased even faster than during the 1960's.

In the 1980's, cropland used for crops has stabilized somewhat, reaching about 372 million acres in 1985, compared with about 332 million in 1970.

An annual increase in farm production has come to be taken for granted, but in the early decades of this century farm production increased slowly.

Agricultural production in the United States rose by 1 percent per year from 1910 to 1930. It rose an average of 1.6 percent annually in the 1930's, 2.2 percent in the 1940's, 2.3 percent in the 1950's, 1.1 percent in the 1960's; and 2.3 percent in the 1970's. From 1980 to the record production realized in 1985, it has had an average annual increase of close to 3.0 percent.

USDA's Forest Service has calculated that the productivity of the Nation's softwood timber resources, as measured according to recently developed indexes, continues to improve. Additional details are in Chapter 50 on Forest Management.

Table 15.—Agricultural productivity

Year	U.S. population (July 1) (millions)	Index of total farm output (1977=100)	Index of* output per work hour (1977=100)	Crops harvested (million) (acres)
1930	[1]123.1	43	NA	369
1940	[1]132.1	50	NA	341
1950	151.7	61	22	345
1955	165.3	69	30	340
1960	180.8	76	42	324
1965	194.4	82	56	298
1970	205.1	84	74	293
1975	216.0	95	90	336
1976	218.0	97	97	337
1977	220.2	100	100	345
1978	222.6	104	104	338
1979	225.1	111	113	348
1980	227.8	104	109	352
1981	230.1	118	123	366
1982	232.5	116	125	362
1983	234.8	96	99	306
1984	237.0	112	121	348
1985	239.3	118	139	342
1986	241.6	111	139	325
1987	243.9	110	142	302
1988	246.1	102	[2]135	298
1989	248.7	[2]114	[2]148	318

[1] Includes all States, as well as territories that later became States.

[2] Estimated

*Revisions made last year in the labor input series produced extensive changes to the indexes for labor and total output per work-hour.

IV. GLOBAL AGRICULTURE

29. FOREIGN TRADE (EXPORTS)

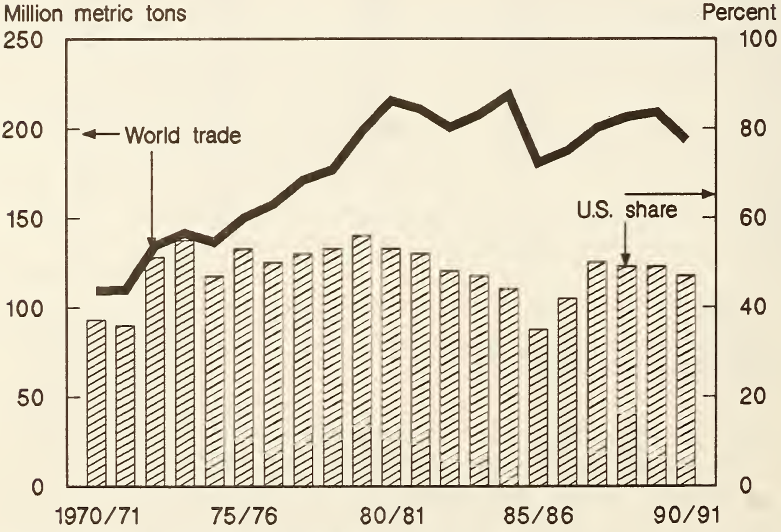
The United States is one of the world's top exporters of agricultural products, with a total share of world trade averaging about 15 percent in recent years.

The export market is vital to U.S. agriculture, with about one-fourth of net farm income coming from overseas sales. Moreover, farm exports sustain about a million U.S. jobs and help reduce the U.S. trade deficit.

Total U.S. agricultural exports in fiscal year 1990 (October 1989-September 1990) stood at $40.2 billion. This was slightly higher (1 percent) than in the preceding year, but off nearly one-tenth from the record high of $43.8 billion set in fiscal year 1981.

Export value was buoyed by strong demand and higher prices for U.S. feed grains, cotton, tobacco, livestock, and horticultural products. The export of these products continued to benefit from the appreciation of foreign currencies in developed markets and export promotion activities under the Export Enhancement Program (EEP) and the Targeted Export Assistance (TEA) Program.

Total world grain exports and U.S. share



1990/91 forecast. Includes wheat flour, excludes intra-EC trade.

Figure 6

Wheat exports as a share of production declined from 78 percent in 1989 to an estimated 61 percent in 1990. Corn producers exported 31 percent of their production in 1990, and about 32 percent of U.S. soybean output (soybean and meal equivalent) was sold overseas.

The United States exports to some 170 countries worldwide. In fiscal year 1990, 76 percent of U.S. exports, amounting to $40 billion, went to just 10 countries/regions. They were, in descending order of sales value: Japan, the European Community, Canada, Mexico, South Korea, the Soviet Union, Taiwan, Egypt, Hong Kong, and Saudi Arabia.

Regionally, Asia was the largest overseas market in fiscal year 1990, taking $18 billion worth of U.S. agricultural products. It was followed by Latin America ($8.8 billion), Western Europe ($7.3 billion), Canada ($3.7 billion), the Soviet Union ($2.9 billion), Africa ($1.9 billion), Eastern Europe ($519 million), and Oceania ($304 million).

30. TRADE BLOCS

Over the past two decades, regional economic organizations—trade blocs—have had a significant impact on world trade in agricultural and industrial products.

Regional economic organizations are defined as free trade areas, customs unions, or common markets. More specifically, two or more countries form a free trade area and agree to reduce or eliminate tariffs on products that originate in their territories. Each member of the free trade area, however, maintains its own tariff schedule for imports from nonmembers.

A free trade area becomes a customs union or common market when the members agree to maintain a common external tariff on imports from nonmembers. In addition, there may be an effort to remove all internal barriers to permit the free flow of labor, capital, goods, services, and even energy.

The European Community (EC), originally composed of Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands, and later joined by the United Kingdom, Denmark, and Ireland in 1973, Greece in 1981, Spain and Portugal in 1986, and East Germany in 1990 (reunified into a single Germany), is an example of such a common market.

The EC was formed in 1957. By 1968, tariffs among the six original member countries had been eliminated. Today, a common external tariff applies to imports from outside countries. A common agricultural policy covering nearly all farm commodities has eliminated differences in national agricultural policies and attempted to attenuate agricultural price differences.

The EC is in a process of strengthening its union through further removal of internal trade barriers. The process is scheduled to be complete by the end of 1992.

The influence of the EC on trade now extends far beyond the boundaries of the current 12 members. Sixty-nine African, Caribbean, and Pacific countries, nearly all of which are former colonies or trust territories of EC countries, have been granted special trade and aid benefits by the EC.

Most Mediterranean countries have preferential trade agreements with the EC.

The European Free Trade Association (EFTA), established in 1960, was originally formed as a temporary organization, an alternative to a European-wide market. Its seven original members included Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom (Great Britain and Northern Ireland). Finland joined EFTA as an associate member in 1961; Iceland became a full member in 1970.

The importance of EFTA as a trade bloc has diminished since the United Kingdom, Denmark, Ireland, and Portugal left it and joined the EC. However, EFTA is moving towards closer economic ties with the EC, its major trading partner.

The United States and Israel concluded a free trade agreement in 1985, which progressively eliminates all tariffs over 10 years. Tariffs on the most sensitive agricultural products, such as processed tomato products and citrus juices, will not be reduced until 1995.

The United States-Canada Free Trade Agreement went into effect on January 1, 1989. The agreement removes numerous trade barriers and expands market access between the two countries for many goods and services. All tariffs, including those applied to agricultural products, will be phased out over a 10-year period. Although the agreement does not cover many sensitive bilateral agricultural issues, it does liberalize quantitative restrictions on trade in grains, beef, poultry, and sugar products.

The Enterprise for the Americas Initiative was announced in June 1990. One of the primary goals of this initiative is to work toward the creation of a Western Hemisphere free trade zone. The first step in this process is the negotiation of framework agreements with individual countries. To date, the United States has signed bilateral framework agreements with Bolivia, Ecuador, Colombia, Chile, Costa Rica, and Honduras.

In September 1990, President Bush notified the Congress of his interest to negotiate a free trade agreement with Mexico. This objective has since been expanded to include Canada, and in February 1991, plans were announced to negotiate a North American Free Trade Agreement encompassing all three countries. There is no intention to reopen the U.S.-Canada Free Trade Agreement in a way that diminishes the liberalization already achieved.

In Latin America, three major economic groups have emerged: The Latin American Integration Association (LAIA)—formerly the Latin American Free Trade Association or LAFTA—established in 1960; the Central American Common Market (CACM), formed in 1961; and the Caribbean Common Market (CARICOM), established in 1973. The provisions of their associations are not as broad as those of some of the other regional economic organizations.

Members of LAIA include Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

Five members of LAIA, the 'Andean Group' of Bolivia, Colombia, Ecuador, Peru, and Venezuela, also have established the Andean Common Market (ANCOM).

The members of the Central American Common Market (CACM) are

Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. CACM is plagued by many problems. Tensions have been provoked by intercountry disputes as well as internal problems of the members. Recently, efforts have been made by the governments in the region to revive this trade arrangement.

The members of CARICOM include the following 13 former British Caribbean dependencies: Jamaica, Trinidad and Tobago, Barbados, Guyana, Antigua, St. Kitts-Nevis, Montserrat, Dominica, St. Lucia, St. Vincent, Grenada, Belize, and the Bahamas.

The Association of Southeast Asian Nations (ASEAN) was established in 1967 to foster closer diplomatic and economic cooperation among its members. Its members are the Philippines, Malaysia, Indonesia, Thailand, Singapore, and Brunei. While ASEAN has been fairly successful in attaining its diplomatic goals by presenting a united front, it has been less successful in creating economic integration among its members.

31. EXPORT EXPANSION ACTIVITIES

The Department's Foreign Agricultural Service (FAS) promotes U.S. exports through a variety of market development programs conducted abroad in cooperation with private sector agricultural export trade associations that represent a wide range of U.S. commodities.

FAS works with 42 commodity associations, known as cooperators. In addition, FAS works with four regional State groups, and the National Association of State Departments of Agriculture; so that all 50 States are represented.

The cooperator program uses two basic approaches to market promotion. One is trade servicing, which helps the buyer choose the right U.S. product and use it efficiently. Trade servicing is usually used to encourage sales of bulk, unprocessed commodities such as soybeans and feed grains. The other approach is direct consumer promotion, which usually is used to assist exports of semiprocessed and consumer-ready products.

USDA also operates a program known as the Market Promotion Program (MPP), formerly the Targeted Export Assistance (TEA) program, that supports activities to promote, expand, and maintain commercial export markets for U.S. agricultural commodities, particularly those that have been hurt by unfair foreign trade practices. Cost-shared promotional assistance is provided through program agreements with U.S. nonprofit agricultural trade associations, regional associations of State departments of agriculture, or private firms to conduct specific market development projects for eligible commodities in specified countries.

The Trade Assistance and Planning Office (TAPO) is a single point of contact within FAS for agricultural exporters who need foreign market information, and for those who believe they have been injured by unfair trade practices. TAPO can help U.S. agricultural exporters contact the appropriate offices of the Federal agencies administering trade remedy laws, and may be able to provide supporting data and information.

In addition, FAS sponsors overseas trade shows featuring U.S. food products, in-store promotions of U.S. foods, and U.S. sales team visits to foreign buyers. The FAS AgExport Connections office helps U.S. companies introduce their products to foreign markets through a combination of market information and trade leads.

FAS maintains trade offices throughout the world to provide more direct service to foreign export markets in major or emerging trade areas. Trade offices are located in Seoul, Korea; Tokyo, Japan; London, England; Hamburg, Germany; Manama, Bahrain; Singapore; Caracas, Venezuela; Tunis, Tunisia; Beijing and Guangzhou, China; Algiers, Algeria; and Jidda, Saudi Arabia.

FAS operates two programs on behalf of the Commodity Credit Corporation (CCC) which are designed to increase the willingness of the private U.S. banking system to extend credit for U.S. agricultural exports.

Under these two programs, which are known as export credit guarantee programs, the U.S. Government agrees to pay U.S. exporters—U.S. banks or other financial institutions—in case a foreign buyer's bank breaks its promise to pay. In this way, USDA reduces the risk involved in selling U.S. agricultural products, and makes both exporters and banks more willing to explore new foreign market opportunities.

USDA's two export guarantee programs differ primarily in the length of the credit periods they cover. One program covers loans with credit terms of 6 months up to 3 years. In fiscal year 1990, nearly $4 billion in guarantee coverage on U.S. agricultural export sales to 25 different markets was provided under this program. Covered commodities included a broad assortment of U.S. agricultural products, ranging from almonds through feed grains to wheat and wood products.

The second program operated by USDA covers loans made for over 3 but not more than 10 years. It is used in promoting exports of U.S. agricultural products where particular circumstances make a longer term appropriate. In fiscal 1990, over $332 million in guarantee coverage on U.S. agricultural export sales to nine different markets was provided under this program.

The 1990 farm bill extended the Export Enhancement Program (EEP), initiated in 1985. The program's major objectives are to expand U.S. agricultural exports and to encourage U.S. trading partners to seriously negotiate on agricultural trade problems.

The program offers Government-owned commodities as bonuses to exporters to expand sales of selected commodities in targeted export markets. Competitive bids are offered to the Commodity Credit Corporation (CCC) by exporters to obtain the bonus commodities. The value of agricultural commodities exported under this program during fiscal years 1985-90 totaled $11 billion.

The 1990 farm bill mandates the sharing of U.S. agricultural expertise on food and rural business systems with emerging democracies. The goal is to develop, maintain, or expand markets for U.S. agricultural exports. To do so, the United States is required to: (1) assess food and rural business systems in emerging democracies; (2) recommend measures necessary to enhance their effectiveness; and (3) identify specific opportunities and projects for improving them.

32. FUTURE MARKETS ABROAD FOR WORLD TRADE EXPANSION

More and more, the health of U.S. agriculture has come to depend on export markets. By 1970, approximately 20 percent of the production of major crops in the United States was going into the export market. By the early 1980's, that percentage had risen to as high as 40 to 60 percent.

The increased dependence on exports has caused the U.S. agricultural community to look toward developing countries as new markets for agricultural exports. Economic development in Third World and middle-income countries has already created some of the largest markets for U.S. products.

Most of the 3-1/2 billion people in the world who would like to eat more live in the less developed countries (LDC's). In addition, though population will eventually plateau as their societies advance, most LDC's will have rapid population growth into the next century. By the year 2000, the population for all developing countries is projected to reach 4.9 billion people. Because the demand for food should increase with population growth, one might easily but mistakenly assume that this growth alone would create a larger market for U.S. agricultural goods.

But most people in LDC's live in poverty, with families earning $200 to $500 per year. Under current conditions, they lack the means to purchase adequate food and fiber, which results in chronic hunger and malnutrition.

It is not hunger or rapid population growth that make countries better customers for U.S. farm producers, because poor people don't buy much. Only through economic development can a country become a marketplace for U.S. goods. Only those with cash or good credit are good customers. U.S. agriculture needs more strong economies among its potential customers.

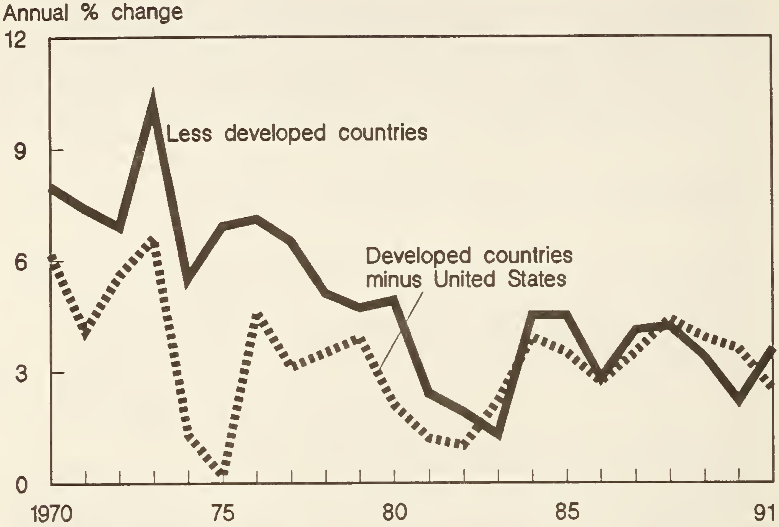
Because 50 to 80 percent of the workers in developing countries are farmers, economic growth must be agriculturally led. Increasing their productivity has the greatest impact on their countries' gross national product (GNP). Not only do LDC farmers represent a high proportion of the population, they spend a very high proportion of the proceeds from their increased production locally on food, other consumer items, and production inputs—such as fertilizer and biological controls.

For every additional dollar poor people in the Third World earn, about 60 cents will be spent on more or higher quality food. With higher income, and improved quality of living, people begin to want meat and other animal products. However, rarely can an agricultural system adopt or adapt technology rapidly enough to keep up with the increasing demand for food. Most agricultural systems are only able to expand at a rate of 3 percent per year, whereas GNP and food demand may grow 8 to 9 percent per year.

The result is that as the income of a family in a developing country goes up, the country's food self-sufficiency usually goes down. The rapid growth in food consumption increases the dependence on agricultural imports, such as grain, protein items, food items not grown in the region, farm machinery, fertilizer, plus some nonfarm items. Thus, an export market is created of which U.S. agribusiness can take advantage.

USDA's Office of International Cooperation and Development (OICD)

Economic growth abroad



1990 preliminary. 1991 forecast.

Figure 7

utilizes the resources of the entire Department, other Federal agencies, U.S. universities, and the private sector to implement technical assistance and training activities which help developing countries strengthen their agriculture, which is usually the starter engine for the entire country's economy. Technology is provided to improve the infrastructure and advance the human resources that are necessary to increase the earning power and, therefore, the buying power of developing countries. An added benefit of such assistance is the fostering of improved international relationships.

OICD manages programs that not only benefit the developing countries but also strengthen U.S. agriculture. These programs focus on two-way sharing of agricultural knowledge through scientific and technical exchanges.

Education plays a powerful role in development efforts. In 1989, OICD managed training in the United States for more than 2,400 foreign agriculturalists. Seminars and courses were also conducted overseas.

Through another activity, the Cochran Middle-Income Country Fellowship Program, 300 senior and mid-level agricultural specialists and administrators from 16 nations received training in the United States. For the first time, Poland was included among the participating countries. Training provided through the Fellowship Program fosters both trade and development goals.

Training, whether in the technical sciences or in management, promotes economic development as well as investment opportunities both in developing countries and in the United States.

Programs such as the U.S. Caribbean Basin Initiative, which is supported by OICD, stimulate U.S. entrepreneurial interest in agricultural trade and investment opportunities. Duty-free access of nontraditional and/or off-season products from the Caribbean Basin, such as fresh fruits, herbs, vegetables, flowers, and ornamental plants, provides a strong incentive for U.S. agribusiness to consider joint ventures with Caribbean Basin partners. Through work with the Secretary of Agriculture's Agribusiness Promotion Council, composed of senior executives from U.S. agribusiness and financial institutions, OICD leads trade and investment missions to the Caribbean.

Scientific cooperation through OICD-arranged team exchanges and collaborative research with other countries enable the United States to gain agricultural technology and collect exotic germplasm and biological materials.

A unique feature of the cooperation between U.S. and foreign scientists is that it often involves scientific work that could not be done in the United States, yet it directly benefits U.S. citizens. For example, through collaborative exchanges the hybrid grain sorghum seed industry in the United States has been able to tap global gene sources. Most of the genes that provide resistance to downy mildew, head smut, anthracnose, charcoal rot, and grain rot in hybrids grown on the U.S. Great Plains today have been provided by sorghum germplasm brought from Africa and India through collaborative exchanges among African, Indian, and U.S. research institutions. In two similar projects completed in 1989, scientists collected and evaluated superior germplasm of triticum in Yugoslavia.

Research in Mexico contributed to the technology used to produce sterile fruit flies which are released in an effort to control the spread of the Med-fly in the United States.

Long-term field research by U.S. scientists in other countries on acid precipitation, disease-resistant germplasm, integrated pest management, Africanized honeybees, and other agriculture-related projects provides access to information and expertise that benefits the U.S. agricultural community.

USDA works closely with the U.S. Agency for International Development, the World Bank, and other donor organizations to implement its technical assistance and training activities.

To promote U.S. policy views overseas, USDA also presents the concerns of U.S. agriculture in dealings with international organizations working in the areas of agriculture and rural development, such as the World Food Program and the Food and Agriculture Organization of the United Nations. The U.S. position on agricultural issues is advanced in the discussions, agreements, and activities of these organizations. Promoting good will globally is another job of OICD.

USDA's 30-year record of assisting developing nations with academic and on-the-job training, observational tours, and scientific and technical training and exchanges clearly shows a U.S. commitment to global economic development and the long-term growth of world markets for U.S. agricultural products.

33. U.S. RESPONSE TO WORLD HUNGER

The United States is the world's largest donor of food. It provides more than half of world food assistance and more to developing countries than do all other nations combined—more than $42 billion in commodities since the 1954 passage of Public Law 480.

P.L. 480, the Food for Peace Program, was created by the Agricultural Trade Development and Assistance Act of 1954. It is the U.S. Government's major tool for providing food aid. Commodity Credit Corporation commodities also are donated to needy people in foreign countries through the Section 416(b) program.

In fiscal year 1990, the United States exported under P.L. 480 an estimated $1.5 billion worth of commodities, including transportation costs. This provided 4.2 million metric tons of commodities on long-term concessional credit terms and 2.1 million metric tons (on a grain-equivalent basis) of donated food commodities for malnourished people in 66 countries. In addition, agreements were signed to provide 1.7 metric tons of commodities through Section 416(b).

The recipients of the largest amounts of Title II food aid donations were in India, Ethiopia, Peru, and Mozambique.

In fiscal year 1990, 34 African countries received a total of about 1 million tons of U.S. food commodities.

The international technical assistance, training, scientific exchange, and research programs described in the preceding chapter also are a major U.S. response to world hunger. Through these efforts the United States is helping build infrastructures and create economic development which can lead to long-term solutions to hunger problems.

34. FOREIGN TRADE (IMPORTS)

The United States was among the world's largest importers of agricultural products in fiscal year 1990. The other major importers were West Germany, Japan, Italy, the United Kingdom, France, and the Netherlands.

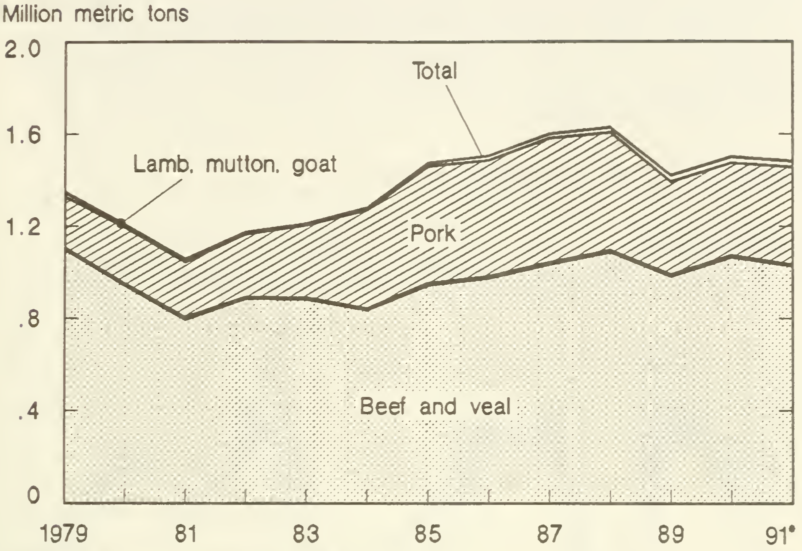
U.S. agricultural imports totaled $22.5 billion in fiscal year 1990. Imports of competitive products such as meats, fruits, vegetables, and sugar were a record high $16.9 billion. Imports of noncompetitive products such as coffee, cocoa, and rubber totaled $5.6 billion. Nearly all noncompetitive items are duty free.

The United States imports agricultural commodities from more than 155 countries. In fiscal year 1990, 56 percent of the value of total agricultural imports came from only 10 countries/regions. They were, in descending order: the European Community, Canada, Mexico, Brazil, Australia, Indonesia, New Zealand, Colombia, the Philippines, and Malaysia.

35. BALANCE OF PAYMENTS

A statement of economic transactions involving the exchange of goods, services, and capital claims between a country and foreign countries is called a "balance of payments." People in the United States pay people in other countries for imported goods and services. Money also is transferred

U.S. imports of red meat



* 1991 estimated. Carcass-weight equivalent.

Figure 8

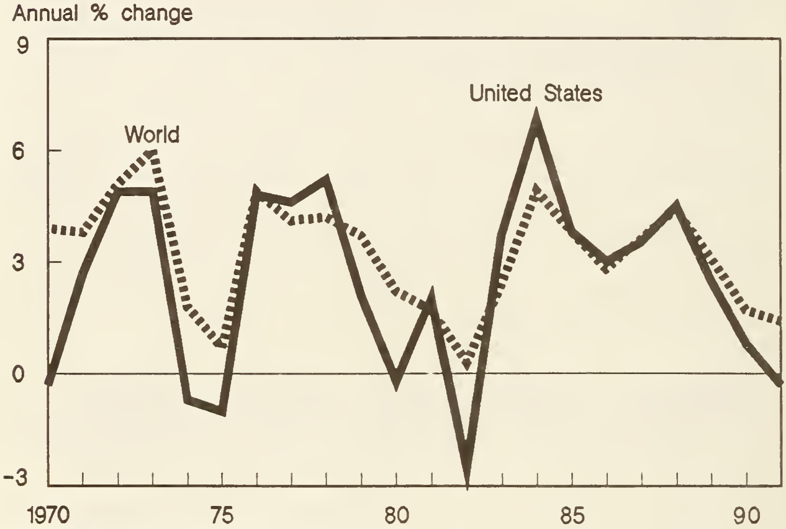
to foreign countries for economic and military assistance, investment, private remittances, pensions, and other purposes. The United States also receives money from other countries, mainly in payment for exports and services, mutual defense, investment, and repayments on U.S. Government and commercial loans. When the outflow of money is greater than the incoming money, a trade deficit occurs. When the amount of incoming money exceeds the outflow, a trade surplus is said to have accumulated. Agricultural exports give the United States substantial balance of payments help. During fiscal years 1960 through 1989, commercial exports of U.S. farm products brought $587 billion back to the United States. In fiscal year 1988 alone, commercial farm exports totaled $38 billion. Exports under Government-financed programs such as Public Law 480 (Food for Peace) totaled over $46 billion from 1955 to 1988; in 1988 alone, exports under these programs amounted to about $1.5 billion. The aggregate net contribution of agricultural exports to the U.S. balance of payments for fiscal years 1980 through 1989 was $166 billion. The contribution in 1989 alone was more than $18 billion.

36. COMPARING OTHER COUNTRIES WITH THIS ONE

U.S. farmers are the most productive in the world. In technology, management, efficiency, output per unit of inputs, research and development—just about any measure of agricultural excellence and growth—the United States has traditionally been the overall world leader. U.S. innovations and aid have helped improve agriculture in nearly all other countries, as well.

Our country accounted for 12.6 percent of world agricultural production (by value) in 1988, even though we have less than 5 percent of the world's population and less than 7 percent of the world's land area. U.S. output in 1988 included nearly 15 percent of the world's livestock production and more than 11 percent of the crops. Year in and year out, U.S. farmers grow about 50 percent of the world's soybeans, 40 percent of the corn, and 25 percent of the grain sorghum.

World and U.S. economic growth



1990 preliminary. 1991 forecast.

Figure 9

The following figures about specific commodities are projected for fiscal year 1990:

- The United States is likely to produce 282 million metric tons of grains—17 percent of total world output.
- In oilseeds, U.S. output of 59.4 million metric tons would be nearly 28 percent of the world's total of 213.6 million metric tons.
- U.S. corn production of 191.2 million metric tons would be nearly 42 percent of world output of 458.5 tons. The next biggest producer, China, is expected to produce only about 40 percent as much corn as our country this year.
- The United States is the world leader in grain sorghum as well. U.S. output should be nearly 28 percent of world output. India and China are the next two top producers, but together barely equal U.S. production.
- U.S. soybean output is projected to be 49 percent of world output. U.S. production is likely to be more than 2 1/2 times the output of second-place Brazil and 5 times that of China or Argentina, the next two top growers.

- Wheat production in this country should be 55.4 million metric tons, more than 10 percent of world production. Only China and the Soviet Union are likely to produce more wheat than the United States.
- In beef and veal production, U.S. output of 10.8 million metric tons would be nearly one-fourth of world output. Second-place Soviet Union is likely to trail U.S. production by 2 million metric tons. Third-place Brazil's production is expected to be less than one-fourth of U.S. output.
- Only China surpasses the United States in pork production. U.S. output this year is expected to be over 11 percent of world production.

In many other commodities, this country is also a leader. These examples illustrate the preeminent position of the United States in world agriculture.

V. RURAL DEVELOPMENT

37. RURAL POPULATION

Today, the United States is primarily urban. People who live in large cities and their suburbs and in towns of at least 2,500 population account for three-fourths of the total population. Rural people in the open country or in places of less than 2,500 population are expected to number about 60 million in the 1990 census.

Although rural population increased from 1970 to 1980 after being rather stable for several decades, its proportion of the total population fell slightly even then because the urban population grew more rapidly. Farm residents now number about 4.6 million, and are a small minority even in the rural population.

The farm population has declined as the technological revolution has greatly reduced the workforce required in agriculture. Since 1970, the rural nonfarm population has grown by an amount greater than the loss of farm people.

Future losses in the farm population will be numerically small compared with those of the past, because the present population is more in line with the state of farming technology, and many farm people also work off the farm. Even with nonfarm growth, the total rural population is not likely to increase very much, because some rural communities become urban as they grow.

Rural population trends vary from one region to another. Over a broad area of the Great Plains, western Corn Belt, coastal plain Cotton Belt, and the southern coalfields, the rural population declined substantially from 1940 to 1970 because of major losses in agriculture and mining employment.

After 1970, most rural counties that were losing population in the 1960's began to grow again because of job development, commuting, or retirement.

However, after 1980, low farm income conditions and a slump in mining and manufacturing employment led to slow but widespread decline in rural and smalltown population. From 1980 to 1990, about half of all rural and smalltown counties decreased in population, generally in the same areas that declined before 1970. Other counties, though, grew enough as retirement or recreation areas, or from commuting to urban jobs, to produce some overall rural population growth.

38. AGE AND RACE

The median age of the rural population (33.6 years) is a little higher than that of the U.S. population as a whole (32.6 years). But migration has greatly altered the age composition in many rural areas.

In a number of Great Plains and Corn Belt counties affected by the drop in farm employment, the median age has risen to more than 40 years as young adults have moved away. In these areas, there are typically more people in their sixties than in their twenties. The needs, attitudes, and preferences of the elderly affect those communities more than elsewhere.

In other rural communities, however, the median age is still in the upper twenties because of higher birth rates or job development.

Except for American Indians, the great majority of blacks and other racial minorities live in urban areas. In the not too distant past, blacks were disproportionately rural and agricultural, but since 1940 they have moved to the cities in large numbers.

In the 1960's alone, the number of blacks and other racial minorities on farms dropped about 64 percent. The decline resulted from the near elimination of the sharecropping tenant system in cotton, peanut, and tobacco production in which many blacks had been engaged.

About 9 percent of the rural and smalltown population was black in 1980; 5 percent was Mexican-American, American Indian, or some other race.

39. NONMETROPOLITAN EMPLOYMENT

In 1989, 26 million people 16 years of age and over were in the nonmetropolitan civilian labor force, either employed or looking for work. Most were working, but an average of about 1.5 million persons were unemployed in any given month during the year.

Since the early 1980's, unemployment rates have been higher in nonmetro than in metro areas. In 1989, annual average unemployment in nonmetro areas was 5.7 percent, compared with 5.2 percent in metro areas (table 16). However, these unemployment rates ignore those jobless people not actively seeking work because they feel jobs are unavailable (discouraged workers) and part-time workers who want full-time work. When the discouraged workers and half of the part-time workers unable to find full-time work are included, the adjusted unemployment rates increase to 9.1 percent in nonmetro areas and 7.5 percent in metro areas.

Unemployment rates are particularly high among nonmetro minorities and teenagers. In 1989, 15.3 percent of the teenagers, 12 percent of blacks, and 9.3 percent of Hispanics in nonmetro areas were unemployed, all higher than corresponding metro rates (table 16). Black teenagers were especially disadvantaged, with over 32 percent of both the metro and nonmetro groups looking for work in 1989. Adjusted unemployment rates show similar metro- nonmetro differences, although the rates are much higher.

However, rural employment conditions have improved markedly over the last decade. Nonmetro unemployment rates have declined fairly consistently since their peak of 10.1 percent during the l980-82 recession. Nonmetro unemployment dropped from 6.2 percent in l988 to 5.7 percent in l989, and has now returned to pre-recession levels. At the same time, employment in nonmetro areas increased by almost a million workers during 1989. Most of the employment gains were among whites, women, and workers aged 35-54 years.

Table 16. Unemployment rates among various metro and nonmetro groups

	Nonmetro		Metro
	1989	1990	1990
Civilian labor force (thou.)	26,209	26,319	98,468
Total employment (thou.)	24,718	24,766	93,148
Unemployed (thou.)	1,491	1,554	5,320
Unemployment rate (pct.)			
All civilian workers	5.7	5.9	5.4
Adult men	4.8	5.2	4.9
Adult women	5.1	5.2	4.7
Teenagers	15.3	15.5	15.5
White	5.1	5.3	4.6
Black	12.0	12.0	11.2
Black teenagers	32.4	30.7	31.2
Hispanic	9.3	10.0	7.9
Adjusted unemployment rate[1]	9.1	9.4	7.9

[1] Unemployment rate adjusted to include discouraged workers and one-half of the workers employed part-time for economic reasons.

Source: Bureau of Census, Current Population Survey.

How the economy will change in the near future is unclear, but many of the Nation's leading economic indicators worsened in early 1991. During past economic recessions, the rural economy deteriorated further and recovered more slowly than the urban economy. A more favorable exchange rate now compared with that of earlier periods may help lessen the rural impacts of a national economic downturn. However, it is likely that rural areas will see higher unemployment rates and a worsening employment picture if the national economy falters in the near future.

40. RURAL INCOME AND POVERTY

Median family income has been consistently lower in nonmetro areas than in metro areas. During the late 1970's and early 1980's, little progress was made in narrowing this gap. In fact, by the late-1980's the gap had widened.

In 1979, median income for nonmetro families ($16,987) was 19 percent below the metro median family income ($21,100). In 1989, the gap was 27 percent between nonmetro ($26,979) and metro ($36,896) levels.

Nonmetro areas also have a higher percentage of their population living below the poverty level. In 1975, 15.4 percent of the nonmetro population had income levels below the poverty level, compared with 10.8 percent of the metro population. Between 1975 and 1978, nonmetro and metro poverty rates declined slowly to 13.5 and 10.4 percent, respectively. Both poverty rates climbed steadily between 1978 and 1983, and have since declined very slowly.

In 1989, incomes of 15.7 percent of nonmetro residents and 12.0 percent of metro residents were below the poverty level.

41. LOCAL GOVERNMENTS

In 1987, there were 91,186 local government units serving the Nation. As of 1986, these local governments employed the equivalent of 8.4 million full-time workers and spent over $427 billion providing public services and constructing and maintaining public facilities. The majority of these government units were located outside Metropolitan Statistical Areas (MSA's).

Over the last 25 years, local government activity increased dramatically in metro and nonmetro areas alike. However, most of the growth occurred in the 1960's and early 1970's. During the late 1970's and early 1980's, inflation-adjusted spending per capita actually declined for the local government sector. Slow growth in the size of Federal and State intergovernmental aid programs, taxpayer resistance to tax increases, and the poor performance of the economy all acted to hold down the growth of local government spending.

The economic recovery helped raise local government revenues by 27 percent between 1982 and 1985, while the cost of government purchases rose by only 16 percent. But many rural governments have not shared in this recovery. A 1987 survey found that 17 percent of rural counties experienced declining revenues from 1981 to 1986. Another survey found that more than half of small cities anticipated revenue declines in fiscal year 1987.

Although these problems diminished during the last few years of the 1980's, most nonmetro governments still tend to spend less per capita than do governments inside MSA's. As a result, debt burdens are lower and fewer dollars are collected for local government functions. Nonmetro governments rely heavily on intergovernmental transfers, particularly from the State government.

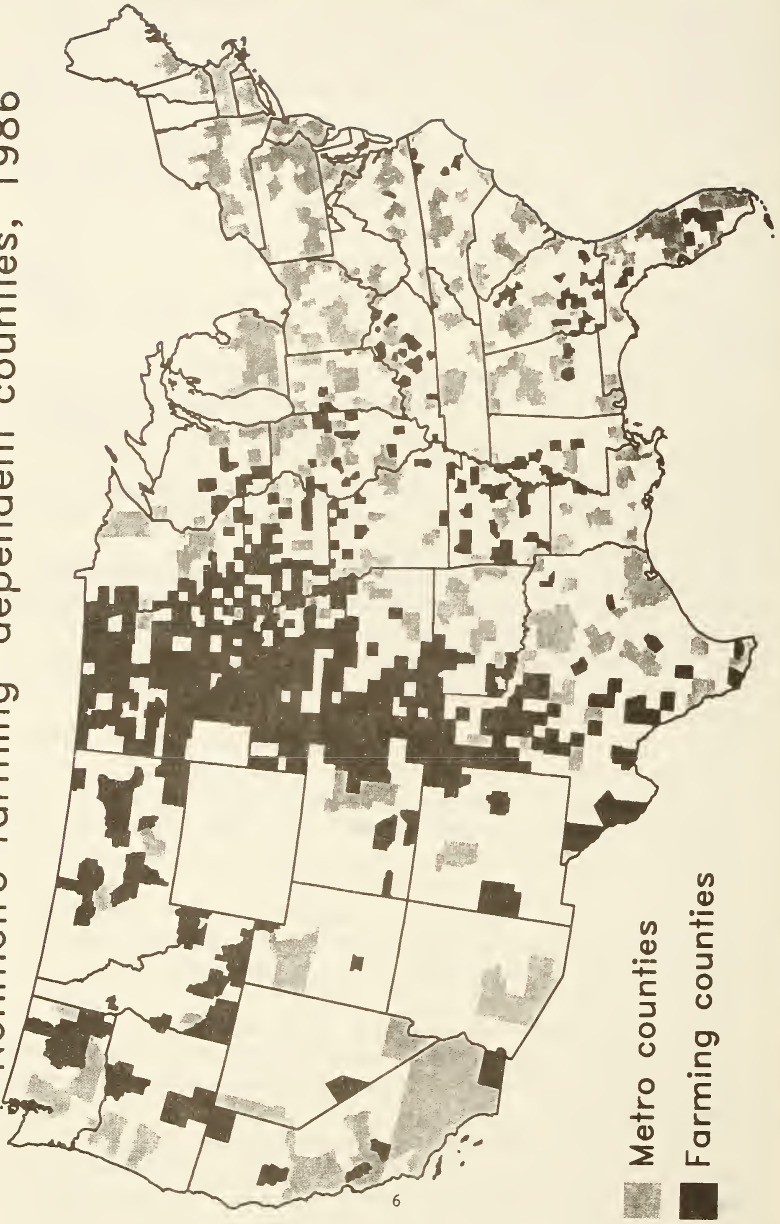
In 1982, 34 percent of the revenue raised by nonmetro governments came from the State (either as State aid or as Federal aid passed through the State government), compared with 30 percent for metro areas.

Both user fees and utility charges have been consistently more important revenue sources in nonmetro than in metro areas. User fees in particular have grown in importance over the last decade.

In contrast, direct Federal aid has consistently been more important to local governments in metro than in nonmetro areas. With the end of General Revenue Sharing in 1986, many nonmetro governments now receive no direct Federal aid.

For many of the governments serving highly rural isolated areas (counties with no urban centers of their own and no close MSA) financial trends of the last decade have created problems much like those faced by large city governments.

Highly rural areas have high per capita property taxes, high tax effort (taxes in relation to income), and high vulnerability to cuts in intergovernmental aid, and have experienced rapid increases in per capita expenditures. Each of these characteristics is associated with potential financial problems.



Nonmetro farming-dependent counties, 1986

Figure 10

42. FEDERAL FUNDING FOR RURAL AREA DEVELOPMENT

Federal funds going to rural areas and small towns grew about as rapidly in the early 1980's as did Federal funding to metropolitan areas. In 1985, Federal funds reaching nonmetro counties averaged $2,725 per person, up 27 percent from 1980. Funding to metro counties averaged $3,327, up 28 percent since 1980.

Federal funding includes payments, loans, and other transfers of money to support Federal, State, and local programs in agriculture, forest management, housing, transportation, education, health, public assistance, Social Security, veterans' benefits, defense, energy, and so on. It also includes interest on the national debt, but this has been excluded for analytic purposes. Figures on the metro-nonmetro distribution of funds are based on the 93 percent of Federal funds that can be reliably traced to county levels.

A larger share of nonmetro funding is in the form of loans and loan guarantees—9 percent compared with only 4 percent of metro funding. Loans must be repaid, so they have less value to the recipients than grants. Nonmetro counties also received a much larger share of their funds for income security programs, especially retirement and disability programs. About 42 percent of nonmetro funds were for such programs, compared with 32 percent of metro funds.

Although nonmetro areas received less defense funding than metro areas, funding of nondefense programs in nonmetro and metro areas was almost identical in 1985. Excluding loans, nondefense funding going to nonmetro areas was $2,175 per person, compared to $2,181 per person in metro areas.

43. RECREATION

Recreation uses are getting more emphasis on both public and private lands. In fiscal year 1987, the national forests, managed by USDA's Forest Service, furnished 238.5 million visitor-days of recreation (1 visitor-day equals 12 hours of an individual's recreation use).

People were attracted to the forests by more than 5,840 campgrounds and picnic areas, 316 swimming developments, 1,145 boating sites, and 330 winter sports sites. If all these facilities were fully occupied at the same time, they could accommodate 1.8 million persons.

The national forest watersheds that provide most of the Nation's big river water supplies are also maintained by the Forest Service.

The Forest Service supervises mining and other surface activities in the national forests and protects lands against fires and erosion. Activities such as these enhance hunting and fishing opportunities. In fiscal year 1987, the national forests supplied 16.2 million visitor-days of fishing and 15.7 million of hunting.

Each year the Soil Conservation Service (SCS) helps thousands of landowners apply conservation practices on the land.

Under Public Law (PL) 83-566, SCS began construction of 2 new small watershed projects in fiscal year 1990, approved planning for 18 projects, authorized installation of 19 projects, and completed construction on, or closed out, 2 projects.

By the end of 1990, public recreation developments in 270 projects had been planned or completed in PL 83-566 small watershed projects in 43 States. This $500 million investment, with 50 percent being funded locally, will provide more than 44 million visitor-days of recreation each year.

The developments include more than 145,000 surface acres of water and facilities for swimming, fishing, boating, waterskiing, camping, hiking, and picnicking.

In fiscal year 1990, work continued in the 194 areas authorized for assistance under the Resource Conservation and Development (RC&D) program: 1,251 RC&D measures were completed, of which 111 were for recreation. SCS provides leadership for these locally initiated, sponsored, and directed areas designed to conserve natural resources.

44. RURAL PUBLIC SERVICES

Rural local governments face special problems in providing services for their citizens. The following are rural characteristics that affect ways in which rural local governments provide services:

First, isolation, the geographic separation of rural areas from metropolitan centers, leads to low utilization rates for rural public services, inadequate response times for emergency services, and the detachment of service delivery professionals from their colleagues.

Second, low population density means higher per unit costs of some services and the inability to supply specialized help (for example, for the handicapped) because the area cannot support the services for so few clients.

Third, the lack of fiscal resources puts many rural communities in a financial squeeze with resulting service deprivation for local residents.

Fourth, the lack of an adequate supply of trained personnel has several implications for service delivery in rural communities. Critical functions may go understaffed, scarce employees are often overworked, service quality and quantity suffer, and long-range planning becomes difficult.

Isolated rural communities often suffer from medical services and facilities that are less adequate than those found in metro areas. Even if medical care services were evenly distributed across the Nation, and were of equal quality, it is likely that nonmetro residents with chronically low incomes would still have serious difficulty receiving adequate care in a complex medical system where access is based mainly on the ability to pay.

Because many rural communities are small and isolated, and lack financial resources and trained personnel, similar problems are encountered in the provision of other rural public services. Various approaches have been taken to deal with these problems.

Some communities contract with private-sector firms to provide services. For example, 36 percent of rural localities contract out legal services to for-profit firms rather than perform such services themselves.

Some communities that want to attract new residents and businesses may find it beneficial to cooperate with other towns and share in the cost of furnishing services they cannot afford by themselves. Rural communities can work together in a variety of ways, and mutual aid is one way. Such an approach is commonly used for fire and police protection.

A second approach is for one community to sell a particular service to another. About 23 percent of isolated rural governments contract with other governments for solid waste disposal, about 19 percent for the operation of libraries, and 18 percent for tax assessing.

Still another method of cooperation is joint action, especially for large projects such as building and operating hospitals or airports. Various methods of dividing costs and creating joint committees or governing boards are worked out for such projects.

Although most rural community residents do not enjoy the same level of public services available to urban area residents, much progress has been made improving some rural services in the last 20 years. Rising incomes and increased aid from higher level governments have made possible more and better programs for rural governments.

The management capacity of rural governments to plan and carry out these programs has improved. For example, in the 1960's and 1970's a nationwide system of multicounty substate regional agencies was developed to help rural communities plan for and manage their new population growth.

Still, the institutional base of rural governments is more fragile than that of urban areas, and these isolated governments remain more vulnerable to external changes than do metropolitan governments.

The Cooperative Extension Systems's National Initiative on Revitalizing Rural America has a focus on rural public services, and on the development of new ways to finance and deliver those services. It is only one of five action programs, under the initiative, which also includes the training of new skills to rural community leaders so they can better build networks, make sound public policy decisions, and adjust to impacts of change on local communities and government.

VI. PROTECTING THE ENVIRONMENT: SOIL, WATER, PLANTS, BIRDS, ANIMALS

45. SOIL AND WATER CONSERVATION

The estimated average annual erosion from the Nation's cropland is more than 3 billion tons of soil, according to USDA's Soil Conservation Service (SCS).

In many areas, the rate of erosion seriously threatens long-term agricultural productivity. Of the 423 million acres of cropland, 171 million acres (40 percent) are eroding at greater than tolerable rates. About 27 million acres (6 percent) of the Nation's cropland are eroding at rates exceeding five times the tolerable level.

Sediment, the greatest single water pollutant by volume, is an end product of soil erosion.

Fortunately for the future of America's farmlands, many practical systems are available for controlling soil erosion. More than 2 million land users have signed up with local conservation districts to apply conservation measures on their farms and ranches.

Technical help comes from SCS, cost-sharing from SCS and the Agricultural Stabilization and Conservation Service (ASCS), and educational programs from the Cooperative Extension System.

Among the most successful techniques for erosion control are various forms of conservation tillage, which leave residue from a previous crop on the field. The ultimate conservation tillage system is no-till. This system leaves virtually all of the previous crop residue mulch on the soil surface on a year-round basis. No-till farming reduces erosion to negligible rates.

The National Association of Conservation Districts' (NACD) Conservation Technology Information Center in West Lafayette, Indiana, encourages greater use of conservation tillage on American farms. USDA, the agribusiness sector, and other organizations help the center with its work.

During fiscal year 1990, SCS provided direct technical services to 1,772,000 land users and units of government. As a result of these services, 426,000 of these land users applied one or more conservation practices on a total of 60.8 million acres. SCS provided conservation plans on more than 50 million acres of land.

SCS gives technical assistance to farmers, ranchers, other individuals and groups, and to local and State governments to reduce erosion and sedimentation, conserve water and improve water quality, reduce energy requirements, and plan better land and water uses. The agency provides help largely through some 3,000 local conservation districts that are organized under State law by local people.

SCS provides technical and financial assistance to sponsoring groups in planning and installing small watershed protection projects under Public Law 83-566 and related acts. The agency also participates in various river basin surveys and investigations, provides flood hazard information for communities, and helps in postflood restoration work on streams and rivers.

SCS has the leadership role within USDA for the Resource Conservation and Development Program; for the Great Plains Conservation Program, which provides long-term financing and conservation assistance in parts of 10 States; and for conducting snow surveys in cooperation with other Federal, State, and private agencies involved in water supply forecasting in the West.

In addition, it has USDA leadership for the National Cooperative Soil Survey.

SCS assists schools in planning and building outdoor conservation classrooms and helps environmental and wildlife groups with natural resource projects. It also finds new strains or adapts grasses, legumes, shrubs, and trees for a wide range of conservation uses, including increased protection and production of pasture and range; windbreaks; wildlife food and cover; protection of streambanks and shorelines; highway rights-of-way; and reclamation of surface-mined land and abandoned mines.

46. CONSERVATION PROGRAMS UNDER THE 1985 AND 1990 FARM BILLS

The Nation's farmers and ranchers have been given numerous new incentives for preserving and protecting agricultural resources under recent farm legislation. Key provisions deal with long-term protection of highly erodible land, wetland preservation, solving water quality problems, and wildlife habitat enhancement.

The Food Security Act of 1985 for the first time linked a farmer's conservation activities to his or her eligibility to receive Federal farm program benefits. Three key provisions of the act dealt with highly erodible land, wetland conservation, and the Conservation Reserve Program (CRP).

USDA's Soil Conservation Service (SCS) is responsible for identifying highly erodible land, wetlands, and converted wetlands, and for helping land users plan and apply conservation systems to maintain their eligibility to participate in certain USDA programs.

Producers who farm highly erodible land without an improved conservation plan will be considered ineligible for USDA program benefits. Under the 1985 law, to maintain eligibility, a producer should have been actively applying an approved conservation plan on highly erodible cropland by January 1, 1990, and must have the plan fully implemented by December 31, 1994.

As of January 1, 1990, conservation plans were completed on about 1.3 million farms.

In return for a farmer's removing land from cultivation, USDA's Agricultural Stabilization and Conservation Service (ASCS) provides long-term annual rental payments in cash or commodities, and provides cost-sharing assistance to cover 50 percent of the cost of establishing a permanent cover on the land.

The farmer must implement a conservation plan approved by the local conservation district. Planning and technical assistance are provided by

USDA, State forestry agencies, and local soil and water conservation districts.

Under the Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA), farmers who convert wetlands after November 28, 1990, to make agricultural commodity production possible may lose eligibility for USDA farm program benefits, even if no crop is planted. Graduated payment reductions for unintentional violations apply retroactively to December 23, 1985. Future USDA program benefits can be regained by restoring the converted wetland to its original wetland characteristics.

The FACTA reinforces and expands conservation provisions begun in the 1985 farm bill. The provisions continue to make the goals of USDA's commodity and conservation programs consistent and to encourage the reduction of soil erosion and the retention of wetlands.

Conservation Reserve Program

The major component of a new Environmental Conservation Acreage Reserve Program (ECARP), part of the FACTA, is the revised CRP. The CRP, first established under the 1985 law, encourages producers to establish permanent vegetative cover for land that is highly erodible or contributing to a serious water quality problem.

Beginning in 1991, the CRP, which was established by the 1985 law, puts greater emphasis on (1) preserving and upgrading water quality, (2) identifying environmentally sensitive areas for special conservation treatment, and (3) planting trees.

The SCS has provided technical assistance to nearly 333,000 farmers who have entered into 10-year CRP contracts with the Secretary of Agriculture. Under these contracts, farmers will convert 33.9 million acres of highly erodible cropland to grass, trees, or wildlife covers. The goal is to enroll 40 to 45 million acres by 1995.

New to the program are incentives to (1) encourage the planting of hardwood trees, windbreaks, shelterbelts, and wildlife areas, and (2) protect a farmer's base crop after the contract expires. Land eligibility has been extended to include cropland that contributes to water quality degradation. Land areas where producers use practices such as grass waterways, contour strips, and filter strips are eligible for enrollment.

Establishment of cover on land now included under CRP contracts will reduce the estimated annual rate of erosion by 19 tons per acre per year from these lands.

The Cooperative Extension System (CES) provides educational programs, and, with SCS, assists farmers in preparing conservation plans.

Wetlands Reserve Program (WRP)

Also included under the ECARP is the new Wetlands Reserve Program (WRP), aimed at discouraging the conversion of wetlands for agricultural purposes. This new program will feature easements, rather than 10-year contracts, to implement approved wetland restoration and protection plans on farms, with a maximum of 1 million acres of farmed lands and wetlands to be converted by 1995.

U.S. crop acreage planted and placed in conserving uses

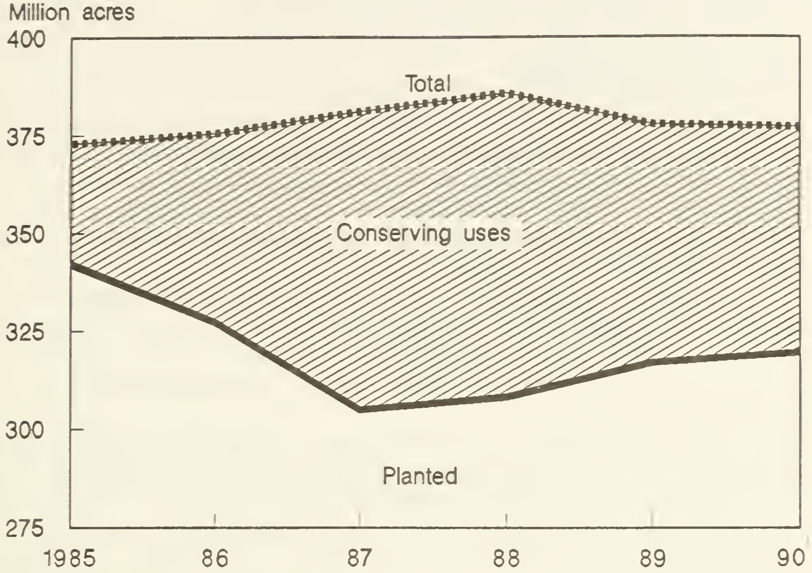


Figure 11

Wetlands consist of soils that are covered with standing water or are saturated part of the year and that could support mostly water-loving plants. The wetlands conservation program could affect an estimated 5 million acres.

Under the WRP, farmers may receive up to 75 percent of cost- sharing assistance to implement a wetland restoration plan on acres granted an easement. ASCS will make payments for acquiring an easement, up to the agricultural value of the land.

Other New Programs Under FACTA

The 1990 law also set up a new Agricultural Water Quality Protection Program, generally now called the Water Quality Incentive Program (WQIP), and an Integrated Farm Management Program (IFMP), discussed below.

The WQIP is a voluntary program with a goal of enrolling 10 million acres of farmland under agricultural water protection plans by the end of 1995. Beginning in late 1991, incentive payments to producers will promote the efficient use of crop nutrients and pesticides and ensure safe storage, mixing, and handling of agricultural chemicals and animal wastes.

The Integrated Farm Management Program (IFMP) is another new voluntary program option for producers, beginning in 1991. Under it, farmers who contract to develop and carry out an approved farm management plan to promote the use of soil-conserving crops and rotations on a portion of their crop base will not lose base as a result. Adoption of resource-conserving crop rotations will help to prevent soil degradation, improve soil conditions, and protect water quality.

Other provisions of the law also are designed to discourage farming practices that may have adverse environmental impacts.

Enforcement and Eligibility.

Under the 1990 law, as with the 1985 law, producers planting annually tilled crops or sugarcane on highly erodible fields must be actively applying a locally approved conservation plan and have that plan fully implemented by December 31, 1994, to remain eligible for USDA farm program benefits. The 1990 law established graduated payment reductions for unintentional violations after November 28, 1990.

The 1990 law also extended loss of program benefits to noncomplying landowners' participation in the Agricultural Conservation Program (ACP), Great Plains Conservation Program (GPCP), Emergency Conservation Program (ECP), P. L. 83-566 Watershed Program, and Disaster Assistance Programs.

The criteria used to identify erodible lands are based on an "erodibility index of eight or more," a technical conservation term that considers the inherent characteristics of the soil to resist the forces of water or wind erosion, not the practices of management applied by humans which may vary from year to year.

47. ENHANCING THE NATION'S WATER QUALITY

The Department of Agriculture has a new Water Quality Initiative, a contribution to the President's Initiative on Enhancing Water Quality.

Its overriding objective is to provide farmers, ranchers, and foresters the knowledge and technical means to respond independently and voluntarily in addressing on-farm environmental concerns and related State water quality requirements.

The initiative's primary focus is on pesticides and plant nutrients (fertilizers) that have been detected in ground and surface waters. In some cases, concentrations have exceeded the Environmental Protection Agency's (EPA) health advisory levels. The focus of the USDA initiative is to minimize the risk of these materials' leaching to ground water or being carried by surface or subsurface runoff to surface streams.

Eleven USDA agencies, in coordination with the U.S. Geological Survey and the EPA, have devised a three-part approach to the above-stated objective. The parts are:

1. Education and Technical Assistance:

The Soil Conservation Service (SCS), Extension Service (ES) in conjunction with the State Cooperative Extension Systems (CES), and Agricultural Stabilization and Conservation Service (ASCS) lead an effort to inform farmers across the Nation about the causes of water contamination and methods for minimizing the risk of such contamination. Minimizing risk can best be addressed by improved management of pesticides and fertilizers both in crop production and in handling and storage in the farmstead area.

In regard to the farmstead, well construction and operation, septic systems, and animal feeding and loafing areas are important factors under consideration.

SCS, ES-CES, and ASCS maintain offices in nearly 3,000 counties of the Nation. Personnel in these offices provide technical assistance, educational services, and financial assistance to farmers who seek such services. An intensive training program is underway to provide water quality expertise in every county office. These three agencies also are conducting three field programs across the country:

a. Demonstration Projects. Sixteen projects (see table 1 in appendix II) are being established on cooperating, privately owned farms for the purpose of demonstrating the treatment of specific nonpoint source pollution problems and promoting their use in other areas with similar problems. USDA believes that other farmers will visit these projects on field days and at other times and will consider how the demonstrated practices may be adapted to their own farm operations.

b. Hydrologic Unit Areas. In selected agricultural watersheds or aquifer-recharge areas (see table 2, appendix II), USDA personnel provide conservation planning and technical and financial assistance to help farmers and ranchers meet State water quality goals without undue economic hardship by solving agricultural nonpoint source pollution problems. States play an important role in identifying the problem watersheds as part of their responsibilities under section 319 of the Water Quality Act of 1987. Whole-basin treatment planning for a given watershed is a coordinated effort by Federal, State, and local agencies and includes public involvement.

c. Water Quality Special Projects. Program funds are reserved under the Agricultural Conservation Program (ACP) at the national level to fund these projects (see table 3, appendix II), which are developed locally by county Agricultural Stabilization and Conservation Committees. The emphasis of these projects is to encourage broad voluntary adoption by farmers within a problem watershed of various conservation measures authorized under the ACP and designed to solve water quality problems within the basin.

2. Research and Development:

The Agricultural Research Service (ARS), Cooperative State Research Service (CSRS) and associated State Agricultural Experiment Stations (SAES), and Economic Research Service (ERS) conduct a coordinated research program consisting of projects at Federal and State facilities in every State of the Union. The purpose of these projects is to provide basic information regarding soil-plant-water-agricultural chemical interactions. This information is integrated during the development of new approaches to managing crop production and associated agricultural chemicals. New management systems are evaluated at management systems evaluation areas (see table 4, appendix II) established at several locations in the Corn Belt.

3. Database Development and Evaluation:

ERS and the National Agricultural Statistics Service (NASS) conduct investigations intended to provide understanding of chemical use on the farm. There are two programs:

a. Chemical Use Surveys. Within a State that is a significant supplier of a given commodity, USDA conducts personal interviews to determine quantities of pesticides and fertilizers used by a selected sample of farmers involved in production of the commodity. Commodities included in these studies are corn, soybeans, wheat, cotton, rice, potatoes, the major vegetables, and the major fruits and nuts. The surveys provide estimates of agrichemical usage in the production of the commodity of interest in each major producing State.

b. Area Studies. Certain specific areas or regions are studied more intensively to investigate the relationship between fertilizer and pesticide use, cropping practices, and related water quality effects. The Delmarva Peninsula on the east side of the Chesapeake Bay is the first study area because it is also a pilot area for the U.S. Geological Survey National Water Quality Assessment Program. The emphasis in these studies is on economic and sociological relationships, and it is expected that results will be useful in identifying successful approaches to overcoming obstacles to producer adoption of water quality-enhancing practices.

48. GREAT PLAINS CONSERVATION PROGRAM

The region known as the Great Plains contains important grazing lands and cropland, including vast acreages of wheat. Located in 10 States, it is an area of light and fragile soils, relatively low rainfall, and periodic drought and dust storms.

In 1956, Congress established the Great Plains Conservation Program (GPCP) to help stabilize the agriculture of this vast area. The program helps land users change their farm and ranch operations to mitigate natural hazards of the Great Plains, such as those related to climate, soil, topography, floods, and salinity. The changes include measures for erosion control, water conservation, and land use adjustment.

Under the program, a participating landowner or land operator:

- Works out a conservation plan and schedule;
- Contracts with USDA's Soil Conservation Service (SCS) to apply all the conservation work in from 3 to 10 years;
- Gets technical help from SCS as needed; and
- Receives from the Federal Government a portion of the cost of conservation treatment as the landowner or operator completes it.

In 1990, 971 farmers and ranchers signed long-term contracts to apply conservation measures on more than 2.7 million acres.

The program is available to farmers and ranchers in 518 counties in the 10 States: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

The GPCP is coordinated with other Federal, State, and local governmental agencies. It is intended to be an addition to, and not a substitute for, other programs available in the Great Plains area.

In 1990, Congress extended the GPCP to September 30, 2001, as part of the 1990 Food, Agriculture, Conservation, and Trade Act.

49. OTHER USDA CONSERVATION AND WATER QUALITY PROGRAMS

The Agricultural Conservation Program (ACP), administered by the Agricultural Stabilization and Conservation Service (ASCS), provides for cost-share assistance to farmers and ranchers to voluntarily carry out measures to reduce soil erosion, solve water conservation and water quality problems, enhance forest resources, and treat other natural resource problems.

The program stresses solving local environmental problems. Local authority under the program is delegated to the county ASC committee, which consults with county conservation review groups to develop approved conservation practices to solve resource problems and enhance the environment.

County conservation review groups represent Federal and State agencies and other organizations interested in soil and water conservation and other environmental problems.

The Soil Conservation Service, Forest Service, and Extension Service and private consultants provide technical program guidance to ASCS committee members and technical assistance to farmers in carrying out conservation practices. If a conservation practice is approved, the Government will pay part of the cost of conservation work, while the farmer pays the balance. Special program provisions provide for an increased cost-share rate for low-income farmers.

The Colorado River Salinity Control Program provides financial and technical assistance to identify salt source areas in the Colorado River Basin; to install conservation practices to reduce salinity levels in the Colorado River; to carry out research, education, and demonstration activities; and to carry out monitoring and evaluation activities. Several USDA agencies cooperate in this effort.

The Emergency Conservation Program (ECP), managed through ASCS, provides emergency funds for sharing with farmers and ranchers the cost of emergency conservation measures needed to rehabilitate farmland damaged by floods, hurricanes, tornadoes, or other natural disasters, and for carrying out emergency water conservation measures during periods of severe drought.

Subject to availability of funds, USDA implements the ECP for eligible farmers and ranchers when the damage is so costly to repair that Federal assistance is needed to return the land to productive agricultural use.

Two other Federal programs that involve water under farm or ranch management have quite different objectives, although both are intended to improve water quality.

The Water Bank Program, operated by ASCS, is available to farmers or ranchers having specified types of wetlands along major migratory waterfowl flyways in designated counties.

The program is designed to preserve and improve migratory waterfowl and other wildlife habitat; preserve and improve wetlands; conserve surface waters; reduce runoff, soil erosion, and stream sedimentation; contribute to flood control, better water quality, and improved subsurface moisture; and accomplish related conservation and environmental objectives.

The Rural Clean Water Program (RCWP), also administered by ASCS, is an experimental program designed as a cooperative endeavor to develop and test policies, procedures, and methods for controlling agricultural nonpoint sources of pollution.

This voluntary program treats specific types of water quality problems such as runoff containing nutrients and/or pesticides, animal waste, leachates, irrigation return flows, and sediment. It also provides long-term financial and technical assistance to owners and operators of privately held agricultural land in selected project areas who install conservation measures to control water pollution.

In addition to these action programs, research is also helping improve water quality through investigations into the basic causes of water contamination and by finding ways to better target pesticides, improve nitrogen management, dispose of pesticide containers and residues, and apply other protection measures.

USDA is also implementing a Midwest Initiative for water quality research to test existing and new farm practices for their efficacy in reducing the movement of pesticides and nitrate nitrogen to ground water. This research will be carried out by the Agricultural Research Service in cooperation with several Midwestern State Agricultural Experiment Stations, with assistance provided through Cooperative State Research Service grants.

50. FOREST MANAGEMENT

Studies show that future demand for timber is likely to rise more rapidly than supply, resulting in increasing costs for housing and other wood products. Forest management programs of the U.S. Department of Agriculture are designed to help meet the rising demand for wood products and other forest goods and services.

USDA's Forest Service (FS) administers 191 million acres of national forests and national grasslands. It cooperates with State foresters in providing advice on forest management and use to non-Federal owners of forested lands and wood processors, and conducts research to support these activities.

The Agricultural Stabilization and Conservation Service (ASCS), in cooperation with the Forest Service and State forestry agencies, provides cost-sharing with private landowners for woodland management practices.

The Soil Conservation Service (SCS) assists private landowners in developing conservation plans for all land uses, including forest lands. Through such programs as the Agricultural Conservation Program, the Conservation Reserve Program, and the Small Watershed Program, USDA further recognizes the importance of America's woodlands in assuring conservation and enhancement of the Nation's natural resources and a quality environment.

America's forest lands occupy about 740 million acres, one-third of the Nation's 2.3 billion acres of land. The national forests occupy 191 million acres, including 85 million acres or 18 percent of the country's 483 million acres of timberland, and contribute 13 percent of the Nation's total annual timber harvest.

Industry owns 15 percent of those 483 million acres, contributing 32 percent of the national timber harvest. Eleven percent is in other public lands which provide about 7 percent of the national timber harvest. But most of the timberland in the Nation, 57 percent, is controlled by about 7.7 million nonindustrial private owners. These private lands contribute 48 percent of the national timber harvest.

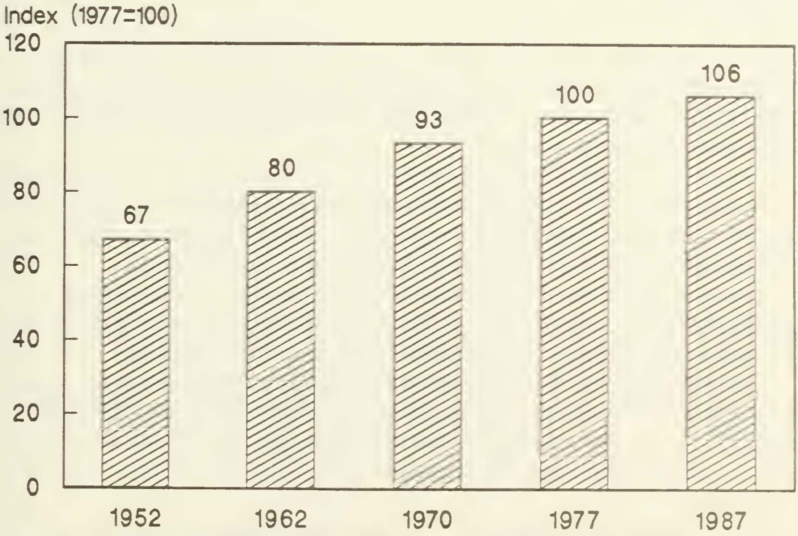
In 1986, about 51 percent of the Nation's timber harvest came from the South, 28 percent from the Pacific coast, and 21 percent from the North and Rocky Mountain areas. The South is expected to continue to be the major timber producer in the future.

Increased wastepaper recycling will have a greater impact on future demand for softwood pulpwood than hardwood pulpwood, and will have the greatest regional impact on pulpwood consumption in the South. As wastepaper recycling increases in the 1990's, future pulpwood needs will grow more slowly than previously anticipated. This is because the largest gains in waste paper recycling are anticipated for paper and paperboard grades that have traditionally used more softwood fiber.

New national measures of forest productivity, for softwood and hardwood timber, were developed recently by the USDA Forest Service. The new forest productivity statistics reveal, very concisely, some of the more important trends in forest productivity which forest resource specialists have been studying for many years.

The productivity of the Nation's softwood timber resource, as measured

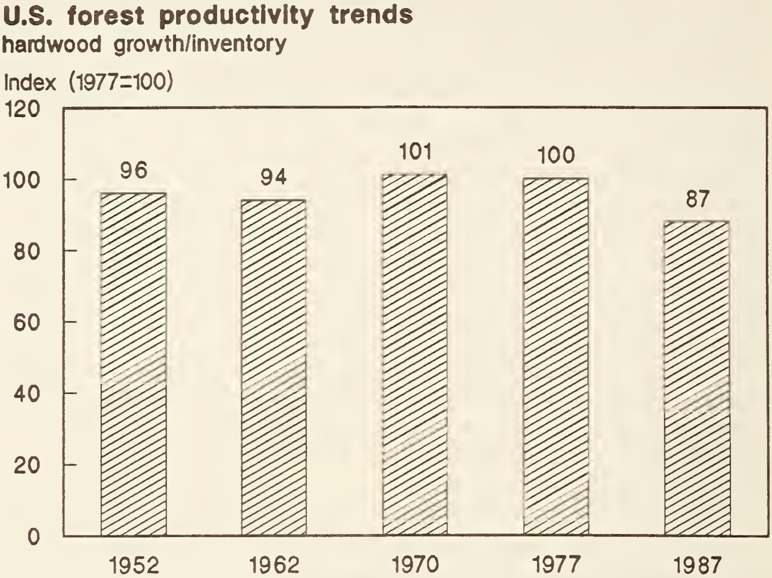
U.S. forest productivity trends
softwood growth/inventory



Note: Net annual growth of softwood timber in relation to softwood growing stock inventory in the United States.

Figure 12

according to recently developed indexes, continues to improve. The indexes show that growth per unit of inventory has continued to increase, as have softwood removals per unit of inventory, as shown in table 18. This nationwide trend reflects increases in harvests relative to inventory on all ownership classes—forest industry, other private, national forests, and other public lands, as shown in appendix I, table 32. Growth increases also occur on all these ownership classes, except the important other private class—primarily in the South. This has been recognized as an issue that needs to be addressed to maintain long-term timber supplies and industrial production and employment.



Note: Net annual growth of hardwood timber in relation to hardwood growing stock inventory in the United States.

Figure 13

The national productivity indexes for the hardwood timber resource show a decline since 1970, despite continuing growth in the total inventory of hardwood timber. This reflects a continuing increase in hardwood inventory substantially greater than the slow increase in annual removals.

Inventory increases are the result of growth rates that continue to be nearly double the rate of harvest. This large hardwood inventory offers an exceptional opportunity to expand domestic and export markets.

The large gains in forest productivity for softwood timber have occurred in conjunction with increased use of softwood timber and consequent better management of the softwood timber inventory, although the recent decline of softwood growth in the South suggests a continued need for improved forest management.

The decline in productivity for hardwood timber, except in terms of growth per acre, suggests that hardwood timber inventory needs better manage-

Table 17.—Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, for all ownerships and regions, 1952, 1962, 1970, 1977, and 1987 (1977=100)

Year	Timber Land area	Softwoods						Hardwoods					
		Net annual growth	Annual removals	Total inventory	Annual growth per acre	Productivity indexes		Net annual growth	Annual removals	Total inventory	Annual growth per acre	Productivity indexes	
						growth/inventory	removals/inventory					growth/inventory	removals/inventory
	million Acres	Billion cubic feet			Cu. ft.			Billion cubic feet			Cu. ft.		
	United States, all owners and regions												
1952	509	7.7	7.8	430	15.2	67	83	6.2	4.1	180	12.2	95	139
1962	515	9.6	7.6	448	18.7	80	79	7.1	4.3	211	13.8	93	127
1970	504	11.3	9.3	458	22.5	92	94	8.5	4.2	236	16.8	99	111
1977	491	12.5	10.0	465	25.2	100	100	9.4	4.2	260	19.2	100	100
1987	483	12.9	11.4	451	26.6	106	117	9.7	5.1	305	20.0	87	103

Source: USDA Forest Service

ment that could result from new markets and increased use of hardwood timber.

The two accompanying charts and table 17 show U.S. productivity trends for both hardwood and softwood.

The Forest Service is responsible for controlling forest insects and diseases directly on the national forests, in cooperation with other Federal departments on other Federal lands, and in cooperation with State foresters or equivalent State officials on State and private lands .

Through its forest pest management program, the Forest Service surveyed 640 million acres of forested lands of all ownerships in 1987, to detect and evaluate pest problems in their early stages.

Through cooperative programs with the States, the Forest Service provided 148,673 "assists" to woodland owners in 1990. Assistance in tree planting, seeding, timber stand improvement, and other woodland activities affected some 1,073,879 acres of timberland.

State nurseries distributed 569 million seedlings for use in forest and windbarrier plantings. USDA funds helped survey 595 million acres of forest for insect and disease infestation, and over 951 million acres were protected from fire with shared USDA funds.

Private forest landowners also improved the recreational potential on 217,470 acres, and wildlife habitat on 565,693 acres. Forest management plans were prepared for 69,505 acres.

The Conservation Reserve Program (CPR) funded 422,000 acres of tree planting in 1990. CRP was authorized as part of the 1985 Food Security Act and has resulted in 2.2 million acres of trees planted on highly erodible lands.

The Forestry Incentives Program (FIP) is jointly administered by the ASCS and the Forest Service (FS) in cooperation with State forestry agencies.

FIP authorizes the Federal Government to share with private landowners the cost of planting trees and improving timber stands. The Federal share of these costs can be up to 65 percent.

Participation in the program is limited to landowners with a maximum of 1,000 acres of forest land, although exceptions can be granted at the discretion of the Secretary of Agriculture for ownerships of up to 5,000 acres.

FIP is available in counties designated on the basis of an FS survey of total eligible nonindustrial private timber acreage that is potentially suitable for production of timber products. In 1990, 186,727 acres were treated under FIP.

From the beginning of the program in 1975 through fiscal year 1990, 110,571 private landowners entered into cost-share agreements with ASCS under FIP. These agreements called for 2.5 million acres of tree planting and for 1.2 million acres of timber stand improvement. All practices were certified by State foresters.

The Forest Service assists State foresters in organizing, training, and equipping local firefighting forces to protect lives, crops, livestock, farmsteads, and other resources in rural areas and rural communities. State foresters are also encouraged to make use of Federal excess personal

Under the Multiple-Use Sustained Yield Act of 1960, these forests must be managed so as to yield a wide range of other social goods and services, including recreation, watershed benefits, livestock grazing, and wildlife habitat.

On national forest lands, the Forest Service in 1990 planted and seeded 213,293 acres, and improved 190,745 acres of young timber by thinning and release from vegetative competition.

The national forests and grasslands are home to more than 3,000 kinds of wildlife or fish and 184 different threatened or endangered species of plants or wildlife. In fiscal year 1990, 1.4 million head of cattle, 104,000 horses and burros, and 972,000 sheep and goats grazed on national forests and grasslands under special permits granted to ranch operators.

In addition to sale of timber, income in fiscal year 1990 was $10.4 million from grazing fees, $64.1 million from mineral receipts, and $46.3 million from recreation and user fees.

The national forests contain 33.3 million acres of wilderness, about 36 percent of the total National Wilderness Preservation System.

At sites operated by eight forest experiment stations and the Forest Products Laboratory, research projects covering forest management, protection, and utilization are underway.

Subjects being investigated include forest genetics and cultural practices to increase yield, control of insects and diseases, suppression of wildfires and beneficial use of fire in forest management, wildlife and fish habitat improvement, recreation, snowpack control and other watershed considerations, environmentally sound harvesting techniques, timber processing techniques to increase yield, use of low-quality or residual wood, protection of wood products from natural degradation, improvements to housing through energy conservation or lumber-saving designs, and urban forestry.

Research findings are made available to the public through publications and the efforts of the Forest Service's State and Private Forestry arm to put innovations into practice.

51. PLANT PROTECTION AND QUARANTINE

In most cases, plant pest problems are handled by farmers, ranchers, and other property owners and their State or local governments. However, when an insect, weed, or disease poses a particularly serious threat to a major crop, the Nation's forests, or other plant resources, Plant Protection and Quarantine (PPQ) of USDA's Animal and Plant Health Inspection Service may join in the control work.

Most pests and weeds that are targets of PPQ programs are not native to America. They gain entry into this country through commercial trade channels, international travelers, or other means. PPQ has the additional responsibility of preventing new introductions.

Agricultural quarantines are the first line of defense against foreign pests. Quarantines regulate the importation of materials that may harbor exotic insects, diseases, or weeds. For example, a tropical fruit may contain the eggs or larvae of a score or more of highly destructive fruit flies. The fruit usually cannot be brought into this country without a permit issued by PPQ, and the fruit may also be subject to inspection, treatment, and other safeguards to eliminate pest entry.

In fiscal year 1989, PPQ inspectors at international ports of entry (along with cooperating Customs officers) inspected approximately 570,000 air and ship arrivals carrying millions of pieces of luggage. Countless commercial shipments must be checked, as well as all ship and aircraft cargo and stores arriving from overseas. In fiscal year 1989, more than 1,118,000 interceptions of prohibited plant material were made from international travelers arriving by plane, ship, and land border crossings.

A large volume of prohibited animal products is also intercepted every year by PPQ inspectors. Such products could be the means of accidental introduction of costly foreign animal diseases such as African swine fever or foot-and-mouth disease (FMD).

History has shown that animal disease viruses most often gain entrance into a country through the medium of unprocessed international garbage. An extended outbreak of FMD could cost the United States $12 billion over a 15-year period and a loss of export markets. Unprocessed international garbage also could be the source of introduction of plant pests such as the Mediterranean fruit fly. By ensuring that international garbage is properly processed by incineration or sterilization, PPQ prevents the introduction of these animal diseases and plant pests.

When foreign plant pests do manage to slip through the quarantine barrier, PPQ conducts short-term operations—such as the 1989-90 Mediterranean fruit fly eradication projects in California and Florida—to eradicate or control outbreaks. When pests are new to this country, control techniques may not be available. In any case, PPQ applies interstate quarantines and takes other steps to prevent spread until effective control measures can be developed.

In many cases, the foreign pests are only minor problems in their native lands because they are kept in check by native parasites, predators, and diseases. Since such natural enemies usually do not exist in the United States, one of PPQ's primary control techniques—in collaboration with USDA's Agricultural Research Service—is the importation, rearing, and release of parasites and other biological control organisms. Other tools include pesticides, release of sterile insects, and cultural controls such as plowing under or shredding cotton stalks.

Control programs are designed with all safeguards needed to protect the health of people, domestic animals, crops, wildlife, and general environmental values. Whenever possible, nonchemical control methods are used. Each program is critically reviewed for its impact on the environment.

One major program PPQ is coordinating is the effort to eradicate boll weevils. The boll weevil first entered the United States in the late 1890's and soon became a major pest of cotton. It has caused an estimated $12 billion in losses to the Nation's economy. In 1973, it was estimated that insecticides applied to control boll weevils accounted for about one-third of all insecticides applied to agricultural crops in the United States.

From 1971 to 1973, a cooperative pilot boll weevil eradication experiment was conducted in Mississippi, Louisiana, and Alabama involving Federal and State agencies and grower associations. Success of this program led to two additional 3-year experiments. One was an eradication trial in North Carolina and Virginia; the second was an optimum pest management trial in Mississippi.

Using the technology developed in these experiments, scientists have eradicated boll weevils from northwestern Mexico and, inside the United States, in Virginia, North Carolina, and much of South Carolina and from California and western Arizona. Additional cooperative State-Federal-grower eradication programs are currently being conducted in Georgia, Florida, and southern Alabama and in Arizona.

The eradication effort uses improved timing of pesticide applications based on results of adult trapping. These traps contain a pheromone (insect attractant) and a small vinyl strip with a contact insecticide that kills all captured weevils. In eradication program areas, traps are placed at an average density of one trap per acre and are checked weekly. Pesticides are applied only to fields that have a predetermined number of trapped weevils. This selective use of pesticides results in fields requiring only a few to no pesticide applications during the growing season. The program emphasizes the timing of pesticide applications, identifies which fields require applications, and reduces total pesticide applied.

Much of the protection and quarantine work is jointly planned, financed, and executed with the affected States. An example of such cooperative effort is the computerized National Plant Pest Survey and Detection System, a nationwide network coordinated by PPQ. Under the system, universities, State departments of agriculture, agricultural experiment stations, and others can monitor pest populations and spot new outbreaks early.

Hemispheric cooperation is maintained through the North American Plant Protection Organization (NAPPO), involving the Canadian, Mexican, and U.S. plant protection organizations. NAPPO's objectives include control of pests of mutual concern or pests that pose an imminent threat to North American agriculture.

52. PESTICIDES AND INTEGRATED PEST MANAGEMENT

The Nation's food and fiber needs are now being met by only a small portion of its total work force, thus freeing many people to provide other goods and services that contribute to our high standard of living.

This would not be possible without methods to control many of an estimated 10,000 species of harmful insects, more than 1,500 diseases caused by micro-organisms, 1,800 different weeds that cause serious economic losses, and about 1,500 kinds of nematodes that damage crop plants.

USDA and partner State agricultural experiment stations (SAES) and State Cooperative Extension Services have expanded their efforts to develop and implement integrated pest management, an approach that uses a combination of techniques to control the wide variety of pests that threaten agricultural products. Integrated pest management involves appropriate reliance on natural pest population controls, usually in a combination of techniques that contribute the most economically effective suppression, including pest monitoring and determination of economic thresholds for such control practices as use of cultural methods, diseases that attack specific pests, resistant crop varieties, genetic methods, attractants, augmentation of parasites or predators, or chemical pesticides as needed.

Scientists in USDA's Agricultural Research Service (ARS) and in SAES, and scientists working with funds from the Cooperative State Research Service (CSRS) are conducting research on the various components of Integrated Pest Management (IPM) to improve their use and application. Their investigations include land preparation and cultivation, crop rotations, fallow, timing of planting and harvesting, and timing of irrigation. They also look for ways to take advantage of a pest's natural enemies.

The interactions between cultural practices and pest management must be understood for an efficient IPM system. Other interactions that must be taken into account include those between pesticides applied in the same field, between pesticides and pests that may develop resistance to the pesticide or to a resistant plant gene, between pests (for example, nematodes, weeds, diseases, and insects) that affect the extent of damage and damage thresholds; and between pests and hosts that may be under other abiotic stress. ARS and SAES also look for ways to take advantage of a pest's natural enemies.

This approach, which is called biological control, has special importance for North America, where most farm pests are immigrants. The immigrant pests can proliferate unhindered, because they often cross the ocean without bringing along their own natural enemies.

In its broad sense, biological control includes techniques such as mating pheromones that are used to lure insects to traps or other devices or to prevent male and female insects from locating each other.

In its classical sense, biological control means using predators, parasites, and pathogens to combat plant pests.

Predators and parasites include insects, mites, and nematodes that naturally attack a target pest. Predators kill the pest outright. Parasites sap the target pest more slowly, gradually injuring or killing it.

Pathogens include bacteria, viruses, or fungi that cause diseases specifically injurious to a target pest.

Research scientists in the ARS, Forest Service, and SAES/CSRS have accelerated research in pest, host, and beneficial agent interactions (antagonism, hyperparasitism, hypovirulence, parasitism, predation); introduction of exotic natural agents; and propagation and release/application of indigenous and exotic competitors, antagonists and parasites of plant pathogens, weeds, mites, and nematode and insect pests. Specific systems such as molecular genetics of baculovirus, transgenic systems, mechanisms and structure of population interactions, regulatory processes in populations, searching behavior, signal systems governing behavior of beneficial agents, evaluation methodology, and decision aids are also under investigation.

Specific pest/host research includes fungal root rots of woody and annual plants; foliar pathogens including several mildew species such as powdery mildews of grain, grapes, and vegetables; plant pathogens (mycoherbicides) to control weeds including nutsedges, morningglory, johnsongrass, velvetleaf, and sicklepod; insect parasites and predators to control sweetpotato whitefly, greenhouse thrips, European corn borer (of corn, tomatoes, and peppers), navel orangeworm, grain aphids (including Russian wheat aphid), cotton boll weevil, cotton bollworm and tomato fruit worm, tobacco and tomato hornworm, Colorado potato beetle, Mexican rice stem borer, tomato pinworm, variegated grape leafhopper, apple maggot, gypsy moth; weeds in rangeland and pastures including various thistles, puncturevine, leafy spurge, diffuse and spotted knapweed, and numerous other annual and perennial weeds; pests in rural, urban, and landscape environs including imported fire ant, cockroaches, mosquitoes, dung- and filth-inhabiting flies; and pests of livestock and poultry, including face flies and horn flies.

In recent years, USDA's Animal and Plant Health Inspection Service (APHIS) has been developing a program specifically designed to take advantage of the research developments for use in biological controls on a broad-scale, organized basis. Targets include established pests as well as newly arrived ones.

Research scientists and State regulatory officials contribute ideas, which are reviewed annually by a Biological Control of Weeds Technical Review Group. The group considers the severity of a weed pest problem, the likelihood that biological control can make a meaningful difference, and the chances that a known biological control agent (or a combination of different biological control agents) can handle the job. The group also makes sure solid evidence exists that the agents will not do inadvertent harm.

Success in biological control is illustrated by the campaign against the alfalfa weevil, which became established in the United States in 1905. It began taking up to $500 million or more from the pockets of U.S. farmers each year.

ARS and SAES scientists saw promise in controlling the weevil with several species of tiny parasitic wasps from Europe. In the 11 States where ARS distributed the wasps between 1959 and 1979, the need to spray chemical insecticides on alfalfa fields dropped an average of 73 percent.

Some States reported virtually 100 percent protection from the weevil. The reduced need to spray has been saving farmers an average of millions of dollars annually, while USDA spent only $1 million on the program over a 20-year period.

APHIS biological control specialists began spreading the parasitic wasps on an organized basis in 1981. After 4 years or more, farmers reduced spraying by 5.4 percent in a 13-State area according to a preliminary study by USDA's Economic Research Service. This generated savings of about 38 cents an acre.

Applied to the estimated 12 million acres of alfalfa produced in those States, savings totaled as much as $4.4 million a year.

The benefits of biological control quickly outstripped the costs, and the benefits increased as the wasps became more firmly established.

APHIS is also the lead agency in a cooperative IPM initiative for grasshopper control in the Western United States. Many cooperating agencies, including the Environmental Protection Agency and the U.S. Department of the Interior, support and participate in the project, which began in 1987 and is expected to last 5 years.

This project is aimed at finding better and more acceptable ways of preventing grasshopper damage, while protecting the environment. Activities include developing means to predict and manage grasshopper outbreaks, developing biological control alternatives that minimize the use of chemicals, and integrating proven control techniques into guidelines for APHIS grasshopper programs.

Breeding resistant crops has been another successful control technique, especially against diseases and insects. USDA and SAES provide resistant germplasm, which is a vital source of breeding materials for providing specific varieties in State and industry programs.

Genetic methods being studied by USDA scientists include the sexual sterilization of insects and their release into a native insect population so that the normal insects mate with sterile insects and do not produce offspring. This method has been extremely useful for suppressing some insect populations, such as the screwworm, over large areas.

Pesticides remain one of our major components in IPM systems, as they are one of the most effective defenses against pests that affect our health and well-being and attack our crops, livestock, pets, and structures.

USDA and SAES conduct studies to find ways to better use pesticides through improved timing and methods of application. They conduct research on development of selective nonpersistent and biodegradable pesticides and on improved formulations of pesticides.

USDA and Land-Grant University scientists are also seeking to improve highly sensitive methods for detecting and measuring pesticides and their metabolites so as to monitor and better ensure safety around pesticide residues.

Department and State scientists investigate the pathology, metabolism, and fate of pesticides in plants, animals, soils, air, and water. Emphasis is given to determining pesticide residues in plants and animals, modes of action, metabolic pathways of degradation, metabolic products formed, and the safe disposition of these products.

Because of limited sales potential, minor uses of pesticides do not provide sufficient economic incentive to warrant registration by the chemical industry. However, as these uses are often highly beneficial to the public, USDA, under the organization of the SAES Inter-Regional Project No. 4, carries out a program to ensure that data are developed to support registration of pesticides for minor uses. This helps assure agricultural producers of continued availability of pesticides for minor uses and assures the public of high-quality agricultural products.

Because pesticides may cause undesirable effects if improperly used, the Department encourages use of effective pest controls that provide the least potential hazard to human health, livestock, fish and wildlife, and beneficial insects.

Persistent or hazardous pesticides are not used in USDA and SAES pest control programs when an effective nonresidual or nonchemical alternative is available. When persistent pesticides are necessary, they are used in minimal amounts, applied precisely to the infested area and at minimally effective frequencies.

USDA and Land-Grant University scientists have developed technologies to remotely sense the presence and densities of pests. In addition,

Crop acres treated with pesticides

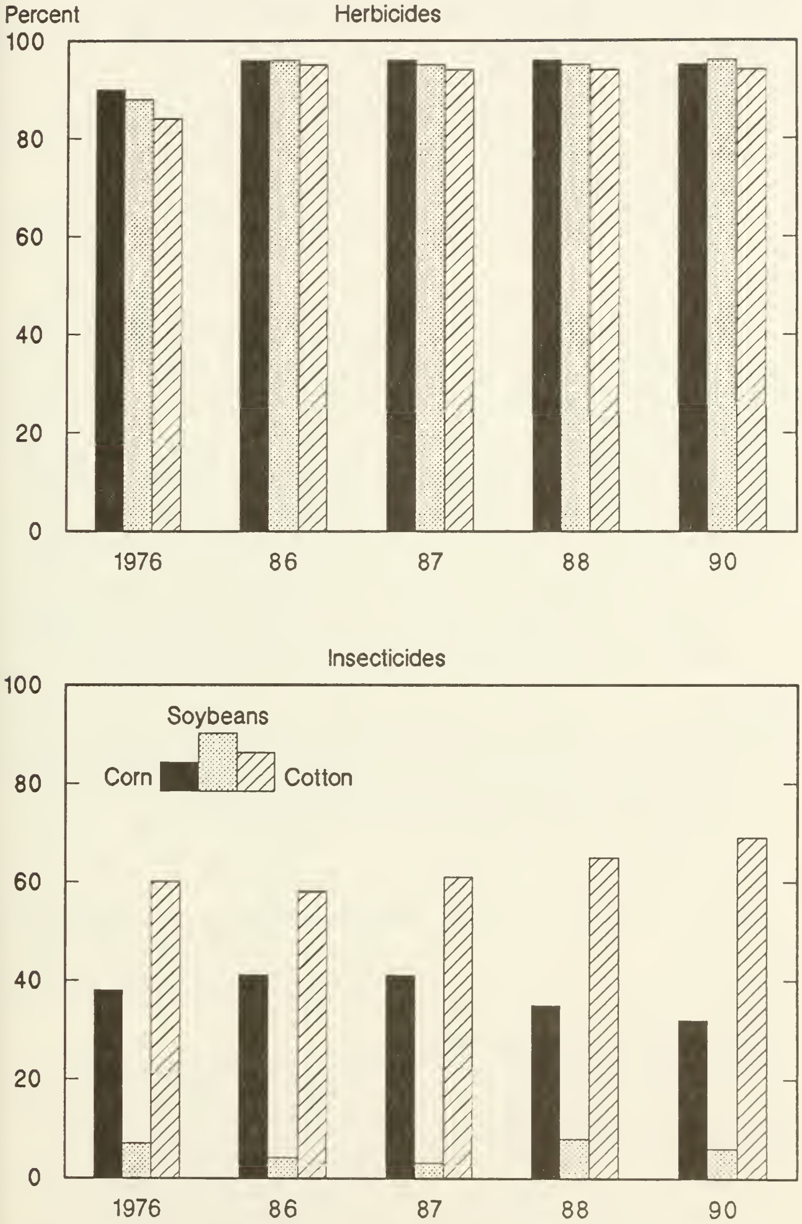


Figure 14

scientists have developed computer-based models to assist growers in analyzing field data as a basis for making the best possible decisions in pest management.

Department and university scientists are also developing ways to harmonize chemical pesticides with IPM systems for a variety of farm commodities to complement farming or production systems.

Scientists are also studying newer methods of pest control, such as hormones that regulate the growth, development, and reproduction of insects and other invertebrates.

Hormones or insect growth regulators (Aggress) occurring naturally in low concentrations at various points in the life cycle of an insect, and related chemicals (analogs), can disrupt a wide range of bodily functions when applied at a critical time during the life cycle.

Aggress are a class of pesticides that have great potential for application in pest management programs because they are narrow spectrum and biodegradable.

Communication of accurate IPM information is part of the Cooperative Extension System mission. CES IPM educational programs affect over 50 million cropland acres a year. This technology transfer is essential to minimize environmental contamination while maintaining yield levels and ensuring a profit.

Because of the important issues related to the use of pesticides and pest control practices, USDA's research and extension partners have conducted a National Pesticides Impact/Assessment Program since 1976. The primary purpose of this program is to coordinate and develop official USDA policy positions and viewpoints on pesticides and related uses.

The program is critical to U.S. agriculture, because accurate, objective data are necessary to evaluate the effects of pesticide regulation in forestry and agricultural productivity and the quality and use of soil and water resources.

In summary, USDA agencies are involved in many activities that promote effective pest management, some of which are addressed above. A substantially increased knowledge base in biological science is necessary to increase the application of Integrated Pest Management.

53. ANIMAL DAMAGE CONTROL

The Animal Damage Control (ADC) program in USDA's Animal and Plant Health Inspection Service (APHIS) provides recommendations and direct assistance to Government agencies and private individuals to help protect American agriculture from injury and damage caused by wild animals—including mammals, birds, and reptiles.

The ADC operations effort is supported by a research section within APHIS' Science and Technology (S&T) unit. Scientists at the Denver Wildlife Research Center (DWRC) develop technically, scientifically, and ecologically sound methods to control damaging animals. Livestock, poultry, commercial fish, timber, grain, and vegetable crops are particularly vulnerable to damage by wild animals. Farm buildings, equipment, levees, roadways, and recreational sites are also subject to damage.

Most activities are conducted on a partnership basis with individuals and local, State, and Federal cooperators who use matching funds to help pay for assistance. The program is carried out under the Animal Damage Control Act of 1931, which authorizes the Secretary of Agriculture to conduct investigations, experiments, and tests necessary in order to determine, demonstrate, and promulgate the best methods for controlling wild animals that are injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, birds, fish, and other domestic animals.

Virtually all species of wildlife can be harmful at times; but many of the serious loss problems are caused by introduced species—such as starlings, pigeons, and English sparrows—or by extremely adaptable species—such as coyotes, pocket gophers, and beavers.

Immature crops, mature grains, and young domestic animals are particularly vulnerable to damage. Control activities protect agriculture throughout all stages of production with emphasis on the periods of greatest vulnerability.

Wildlife damage control research is conducted by interdisciplinary teams assigned to DWRC in Colorado and at field stations strategically located throughout the country. These teams work to understand the causes of animal damage and to improve control techniques and strategies. Knowledge gained is used in control activities and is provided to the public through publications, seminars, and extension education courses.

Educational and operational assistance is provided in all States by a cadre of highly skilled wildlife biologists. Assistance depends on the level of cooperative involvement and extent of animal damage at the local level.

Program involvement in the Eastern States typically involves providing technical advice and assistance to agencies and individuals who, in turn, implement their own control efforts. In these States, most losses are attributable to concentrations of depredating birds, migratory waterfowl, field rodents, and both carnivorous and herbivorous mammals.

The Central and Western States tend to experience the greatest degree of losses and, accordingly, receive the greatest degree of ADC assistance. Employees provide technical assistance and are assigned to each State according to the level of cooperative support needed to conduct control activities. Losses to agriculture in these States are primarily attributable to predators, beavers, field rodents, and concentrations of depredating birds.

The ADC program deals with some 28 different kinds of loss affecting 43 agricultural crops, 24 types of livestock, 7 types of forestry/range, and about 18 types of property.

54. VETERINARY SERVICES

Protecting the health of the Nation's livestock, poultry, and other animals is the responsibility of Veterinary Services (VS) of USDA's Animal and Plant Health Inspection Service.

This team of trained veterinarians, animal health technicians, and other professionals has four primary tasks:

(1) keeping foreign diseases out of this country;

(2) eradicating foreign disease outbreaks that get past our border defenses;

(3) fighting domestic animal diseases of economic significance; and

(4) preventing interstate spread of diseases.

Disease control and eradication programs are carried out through close cooperation among the Federal and State governments, the veterinary profession, and the livestock and poultry industries.

This organized effort against livestock diseases began in 1884 when Congress created a special agency within USDA to combat bovine pleuropneumonia—a dreaded cattle disease that was crippling exports as well as taking a heavy toll of cattle in the Northeastern and Midwestern States.

Within 8 years, contagious bovine pleuropneumonia had been eradicated. This campaign set the pattern for subsequent disease control and eradication programs.

Diseases that have been eradicated from the United States in addition to bovine pleuropneumonia include foot-and-mouth disease (FMD), Texas cattle fever, dourine, glanders, fowl plague, Venezuelan equine encephalitis, sheep scabies, screwworms, exotic Newcastle disease, hog cholera, and lethal avian influenza.

Other diseases and parasites currently being combated by VS include brucellosis, cattle fever ticks, scrapie in sheep, bovine tuberculosis, and pseudorabies in swine.

Disease control and eradication measures include quarantines to stop the movement of possibly infected or exposed animals, testing and examination to detect infection, destruction of infected (sometimes exposed) animals, treatment to eliminate parasites, vaccination in some cases, and cleaning and disinfection of contaminated premises.

In this era of rapid air and land travel, U.S. livestock are exposed to ever-increasing threats from exotic diseases. Import regulations administered by VS are aimed at keeping out such dangerous diseases as FMD, African swine fever, and rinderpest. VS also certifies the health of export animals.

A special team of trained veterinarians and livestock inspectors has been established within VS to respond immediately to any outbreak of a foreign animal disease.

VS programs are carried out by a field force of about 250 veterinarians and about 357 lay inspectors working out of area offices (usually located in State capitals). Laboratory support for these programs is supplied by APHIS' Science and Technology technicians in the National Veterinary Services Laboratories at Ames, Iowa, and Plum Island, New York. Staff officials for the various programs are headquartered in Hyattsville, Maryland.

55. ANIMAL CARE

USDA's Animal and Plant Health Inspection Service (APHIS) enforces humane laws, including the Animal Welfare Act and the Horse Protection Act. Regulatory Enforcement and Animal Care (REAC) within APHIS is responsible for inspection and enforcement activities under both of these laws.

For the first time, APHIS has a regulatory enforcement and animal care group that works exclusively on those tasks. It is a new group that reports directly to the APHIS administrator. One of the purposes of establishing it was to make communications on animal care easier for regulated industries, interest groups, and the general public. Also, a separate unit allows for greater emphasis on better trained, full-time technical people to work in the area of animal care, which results in greater uniformity in enforcing the laws.

The Animal Welfare Act covers all warm-blooded animals, with certain exceptions (e.g., rats, mice, and birds). However, it specifically excludes domestic farm animals that are raised for food or fiber. This act prescribes care and treatment for animals used in research, the wholesale pet trade, zoos and circuses, and while in commercial transportation.

APHIS enforces the Animal Welfare Act through a system of licensing and registration of regulated businesses. This is coupled with inspections to ensure that licensees and registrants are complying with the standards for proper care and handling of animals covered by the act.

The Horse Protection Act is enforced through inspections of horses at shows by APHIS personnel and by "Designated Qualified Persons" (DQP's), who are licensed by industry organizations and certified and monitored by APHIS.

VII. FOOD PROTECTION, MARKETING, AND DISTRIBUTION

56. MEAT AND POULTRY INSPECTION

Americans enjoy the safest meat and poultry supply in the world, thanks to the commitment of the food industry and the rigorous inspection these products receive.

USDA's Food Safety and Inspection Service (FSIS) carries out its inspection responsibilities under the Federal Meat Inspection Act and the Poultry Products Inspection Act. More than 7,800 food inspectors and veterinarians carry out the inspection laws in some 6,500 privately owned meat and poultry plants around the country, ensuring that all domestically produced meat and poultry sold in interstate or foreign commerce is safe, wholesome, and accurately labeled.

Meat and poultry sold only within a State may be inspected under a State inspection program equal to the Federal program. If a State is unable to operate its own inspection program, FSIS must assume responsibility for this inspection as well.

To ensure the wholesomeness of imported meat and poultry products, foreign inspection systems are reviewed and monitored to ensure they are equal to the U.S. system. In addition, 77 import inspection personnel at 218 official import establishments reinspect statistically selected products. This is in addition to inspection by the country of origin.

In fiscal year 1990, FSIS domestic inspectors passed as wholesome almost 125 million meat animals, almost 6.3 billion birds, and millions of pounds of processed products. In addition, import inspectors approved 2.6 billion pounds of imported products.

Scientific analyses are increasingly used to ensure the safety of meat and poultry products. In fiscal year 1990, about 2.2 million analyses were performed on 525,000 samples of meat and poultry to determine the composition of products and to test for contaminants such as bacteria and chemical residues.

Meat and poultry that is unwholesome, adulterated, or mislabeled must be kept out of the food supply. Almost 99 percent of inspected products passed inspection. However, during fiscal year 1990, FSIS inspectors condemned more than 71 million birds (only 1.13 percent of carcasses inspected). In 1990, FSIS import inspectors condemned almost 14 million pounds of products intended for entry into the United States.

Labels on meat and poultry products must be approved by FSIS before they can be used by the industry. In fiscal year 1990, FSIS reviewed almost 185,000 labels, approving without changes approximately 87 percent of those reviewed.

The USDA inspection seal is not the agency's last step in protecting the public. Compliance officers monitor marketing channels to check for uninspected meat and poultry, inaccurate labels, and contaminated or spoiled products. They work with USDA's Office of Inspector General and other Federal and State enforcement authorities to seek appropriate criminal sanctions for violators of inspection laws.

FSIS also conducts an extensive health education campaign to encourage safe food handling and preparation among home and institutional food handlers. This program reaches millions of Americans through its toll-free Meat and Poultry Hotline (1-800-535-4555).

57. EGG PRODUCTS INSPECTION

The purpose of the Egg Products Inspection Act is to ensure that eggs and egg products that reach the consumer are wholesome and unadulterated. Egg products are used by many large manufacturers to make cakes and other prepared food products.

Under the act, the Agricultural Marketing Service (AMS) provides continuous mandatory inspection in all plants processing liquid, dried, or frozen egg products. The act also controls the disposition of restricted shell eggs, those that might contain harmful bacteria that could cause foodborne illness.

In fiscal year 1989, AMS inspected some 1.6 billion pounds of liquid, frozen, and dried egg products in 83 processing plants.

USDA and cooperating State agencies began fiscal year 1989 with 2,183 egg handlers and hatcheries, and ended the fiscal year with 2,019, making 8,680 visits to ensure that restricted shell eggs were disposed of properly.

More than 500 samples of egg products were analyzed for chlorinated hydrocarbon residues, and no violative products were detected.

Under the act, egg products from a foreign country can be imported into the United States only if the country's inspection system is equivalent to that of the United States. Canada and the Netherlands are the only countries eligible to export egg products to the United States.

58. FOOD PURCHASE PROGRAMS

Each year, through the Agricultural Marketing Service (AMS), USDA buys substantial quantities of food that are donated to schools, needy persons, public institutions, the elderly, and disaster victims.

Donations of food started in the 1930's with programs to help market some of the surplus products farmers couldn't sell and to get the surplus products to people who couldn't afford to buy them. Donations of foods stored under price support programs began in 1949.

Some of the laws that govern USDA food purchases are:

Section 32 of the Agricultural Act of August 24, 1935, as amended, which expands market outlets for agricultural products.

Section 6 of the National School Lunch Act, as amended, which requires the purchase of commodities to supplement food programs to help ensure nutritionally adequate meals for children.

Section 416 of the Agricultural Act of 1949, which authorizes donation of foods from Commodity Credit Corporation (CCC) stocks.

Section 709 of the Food and Agriculture Act of 1965, which authorizes CCC to purchase dairy products at market prices when CCC stocks are not available.

Section 4(a) of the Agriculture and Consumer Protection Act of 1973, as amended, which authorizes funds to maintain the level of donations for domestic assistance programs, except for schools, without regard to previous restrictions on price. Similar authority for schools is provided under the National School Lunch Act, as amended.

Section 311 of the Older Americans Act of 1965, as amended, which authorizes funds for nutrition programs for the elderly.

During fiscal year 1990, USDA furnished about 2.1 billion pounds of food for distribution in the school lunch and other feeding programs, at a cost of about $1.3 billion.

The governmentwide Food Quality Assurance (FQA) Staff of AMS' Fruit and Vegetable Division has the responsibility for managing commercial item descriptions and Federal specifications for food and coordinating quality assurance work for food purchased by the Federal Government.

FQA's goal is to make sure that the Government buys its food as efficiently and economically as possible. To accomplish this, it gathers and reviews all specifications used by the Government for a single food item and recommends changes to eliminate duplication, reduce complexity, improve clarity of language, and keep specifications current for Government needs.

It also approves final specifications used by all Government agencies and maintains a central file of all specifications used by the Federal Government to buy food.

59. FOOD ASSISTANCE PROGRAMS

USDA's Food and Nutrition Service has several programs which provide food assistance to needy families and children. These programs provided over $24 billion in food aid to low-income Americans in 1990. All programs are operated in cooperation with State and local governments.

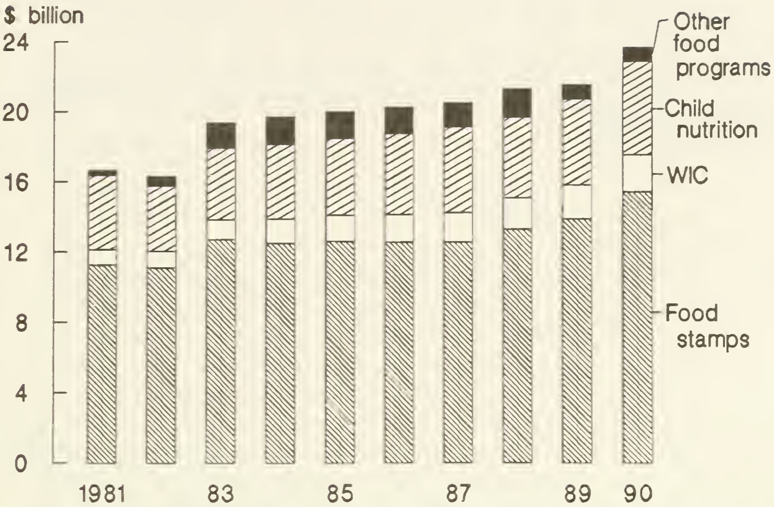
The Food Stamp Program helps low-income families improve their diets by providing them with coupons to purchase food at any authorized retail food store. The program was started in 1961 as a pilot project and was reauthorized through 1995 in the Food and Agricultural Resource Act of 1990. Food stamps are available in every county in the United States. Some 20 million people were served by the Food Stamp Program in 1990 at a cost of $15.4 billion.

The 1990 farm bill made a number of changes to the Food Stamp Program, particularly in the areas of program administration and retailer integrity. Several provisions of the 1990 farm bill are designed to simplify the program, from the perspective of the States that administer the program and of program participants and applicants. Other provisions are designed to reduce misuse of food stamps by retailers authorized to accept stamps.

The Food Distribution Program distributes foods acquired under price support, surplus removal, and special purchase programs directly to schools, institutions, disaster relief agencies, summer camps, nutrition programs for the elderly, and needy family programs on Indian reservations.

In addition, millions of low-income people receive free surplus Government commodities donated by USDA and distributed by local agencies and

USDA costs for food assistance



1990 estimated. Fiscal years. Other programs include administrative costs and surplus commodities. Food stamps include cash assistance for Puerto Rico. WIC is Women, Infants, and Children Program.

Figure 15

volunteers. The list of available "free" commodities for special distribution now includes butter, flour, honey, cornmeal, and cheese.

The Food and Agricultural Resource Act of 1990 extended The Emergency Food Assistance Program (TEFAP) through 1995. The act also authorized an appropriation of $120 million per year for USDA to purchase foods with a high nutrient value for distribution to low-income families through TEFAP. Additionally, the act authorized USDA to purchase $32 million worth of Federal food for distribution to soup kitchens and shelters for the homeless in the coming year.

The Child Nutrition Programs benefit children from low-income families through school lunches, school breakfasts, and year-round and summer food service programs in nonschool situations such as day care centers and recreation programs. Federal contributions in cash and foods totaled about $5.5 billion in 1990.

The National School Lunch Program helps participating schools serve meals that meet nutritional standards (set by the Secretary of Agriculture) to children across the country. The meals are federally subsidized, in cash and commodities, so that participating schools can offer free and reduced-price lunches to children of needy families. Approximately 24 million children are served each day at an annual cost of $3.8 billion.

The School Breakfast Program, which is similar to the lunch program, provides nutritious breakfasts to children at school. The program currently serves breakfasts to over 4.1 million children, 86 percent of whom are eligible for free or reduced-price meals.

The Special Milk Program helps schools and other nonprofit child care institutions not participating in any other federally subsidized meal program make fluid milk available to children. Split-session kindergarten children may participate in this program if they do not have access to a meal program.

The fluid milk helps offset the cost of milk to paying children and provides free milk to those who qualify. The program currently serves an average of a million children daily.

The Child and Adult Care Food Program provides food service to needy children in the summer or during extended school vacations. Public or nonprofit private nonresidential institutions or residential summer camps may sponsor the program. This program currently reaches over 1.5 million children. In addition, about 18,000 adults in certain day care centers that care for functionally impaired persons receive meals under the program.

The Special Supplemental Food Program for Women, Infants, and Children (WIC) provides cash grants to States to make specific supplemental foods, nutrition education, and health care referrals available to pregnant, breast-feeding, and postpartum women, and infants and children up to 5 years of age. The program operates in 50 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. It is also operated by 32 Indian tribal organizations. It is currently reaching 4.5 million people.

The Commodity Supplemental Food Program (CSFP) provides a variety of federally purchased foods to supplement the diets of low-income pregnant, breast-feeding or postpartum women, and infants and children under 6 years of age. Currently, the program serves about 137,000 participants up to age 6 and more than 30,000 women.

In addition, persons 60 years of age and older can also receive various commodities provided through the CSFP. An average of about 107,000 low-income elderly persons were served in fiscal year 1990.

60. MARKETING IMPROVEMENT

The Federal-State Marketing Improvement Program, administered by USDA's Agricultural Marketing Service (AMS), is designed to solve problems at the State and local levels. In 1989, this matching fund program, where a State must contribute an amount equal to the Federal grant it receives, involved marketing improvement work under 27 projects in 19 States.

The projects covered improved marketability of agricultural products, domestic market development, economic and physical efficiency of marketing, improved marketing information, developing alternative crops, objective measures for quality grading, and studies of new marketing concepts.

The Wholesale Market Development Program conducts research to find new ways of improving the efficiency of handling and storing food products moving between the farmer and retail outlets. In particular, the program emphasizes the development and design of modern facilities that will contribute toward this goal of efficiency.

Design and feasibility studies are conducted to develop and/or modernize wholesale food distribution centers to serve major urban areas of the United

States. Also, significant effort is directed toward the development and design of modern farmers' markets to serve as additional outlets for growers.

Additional research is conducted under the program to find ways of improving specific food processing and warehousing activities as well as developing information, systems, and strategies useful to growers and handlers in increasing marketing efficiency. The Wholesale Market Development Program is located in AMS' Transportation and Marketing Division.

61. RESEARCH AND PROMOTION PROGRAMS

Research and promotion programs enable farmers to finance their own coordinated programs of research, producer and consumer education, and promotion so as to improve, maintain, and develop markets for their commodities and to solve production and marketing problems.

Laws have been passed authorizing research and promotion programs for beef, cotton, dairy products, eggs, floral products, honey, lamb, mohair, pork, potatoes, watermelon, and wool. In 1990, the soybean, lime, pecan, fluid milk, and mushroom industries asked Congress for authority for similar programs for their products and Congress approved the requests.

In general, once legislation is enacted, a proposed order is drafted by the industry and submitted to the Department of Agriculture. Then, depending upon the legislation, there could be public hearings, development of recommended and final decisions, and a producer referendum. USDA's Agricultural Marketing Service has oversight responsibility for such programs.

A promotion and research order for watermelon was issued June 8, 1989.

The promotion and research order for honey was issued July 21, 1986. It authorizes promotion and research projects to be funded through assessments on domestic honey producers and importers.

Separate promotion and research orders for beef and pork were implemented in 1986 to strengthen each product's position in the marketplace. The beef program is financed by a mandatory assessment of $1 for each head of cattle sold in the United States and an equivalent amount on imported beef and cattle. The pork program requires an assessment of 0.25 percent of the market value of all hogs sold in the United States and an equivalent amount on imported hogs, pork, and pork products.

Congressional action in 1988 eliminated the refund section of the egg producer assessment provision of the egg research and promotion law effective January 1, 1989, and the action was approved in a producer referendum in the summer of 1990. A 5-cent assessment per 30-dozen case of eggs produced in flocks of over 30,000 hens currently finances the program.

Under the cotton order, a research and promotion program is designed to expand markets for cotton and its products and to improve cotton's competitive position in domestic and international markets. Producers pay $1 per bale plus an additional assessment of 0.6 percent of the value of the cotton to finance advertising and promotion projects and to support production, processing, and marketing research for development and improvement of cotton products.

The order is administered by a cotton board composed of producer representatives selected by the Secretary of Agriculture from nominations made by cotton producer organizations.

A national program for dairy product promotion, research, and nutrition education is financed by a mandatory, nonrefundable 15-cent-per-hundredweight assessment on all milk sold by dairy farmers. Started in May 1984, the program was extended indefinitely following approval in an August 1985 producer referendum. It is by far the largest of the programs in terms of dollars—nearly $210 million annually.

62. MARKETING ORDERS

A Federal marketing order gives farmers a means of solving a wide range of problems through unified action. It is a flexible tool. It can be tailored to the needs of those using it. It is a legal tool. It has the force of law, with the Government (USDA) ensuring an appropriate balance between the interests of agriculture and those of the general public.

Each partner—producers and Government—has a unique role. Producers initiate orders and participate in administering them when the orders so provide. USDA, through its Agricultural Marketing Service (AMS), furnishes guidance and sees that the orders are properly administered and enforced.

Marketing order authority is broad and varied, but the basic purpose is to provide the orderly marketing of fruits, vegetables, and milk, and to ensure an adequate flow of supplies.

A proposed order for eggs was defeated in a referendum conducted in May and June 1987, as was a proposed order for Florida strawberries in an August 1988 referendum.

MILK: Federal milk marketing orders establish minimum prices, based upon supply and demand conditions, at which milk handlers or dealers may buy milk from dairy farmers. The order must be approved by at least two-thirds of the farmers supplying milk to the marketing area. A favorable vote by three-fourths of the producers is required under some circumstances. Public hearings are held when establishing new orders or making order changes.

Operating at the first level of trade, where milk leaves the farm and enters the marketing system, Federal orders lay the foundation for building more stable marketing conditions. They contain a built-in flexibility needed to cope with market changes. To those living in Federal milk marketing order areas, this helps ensure a steady supply of fresh milk. Most of the Nation's major population centers are within a milk marketing order area.

FRUITS, VEGETABLES, AND SPECIALTY CROPS: Growers of certain fruits, vegetables, and specialty crops (spearmint oil and some nut crops are examples) use marketing agreements and order programs to bring greater stability and orderliness to marketing.

There were 46 such programs in fiscal year 1989 covering about $5 billion (at the farm level) in crops grown in 33 States.

As in the case of milk marketing orders, orders and agreements for fruit and vegetable growers are issued by the Secretary of Agriculture only after a public hearing where producers, marketers, and consumers may be heard, and after approval by vote of the producers.

After an order and agreements have been issued, the growers and handlers administer them through a committee made up of industry members and, in many cases, an additional member who is appointed to represent the public's interest. Their work is financed by industry assessments.

Most of the orders and agreements have quality and size regulations which make available for the fresh produce market the most desirable grades and sizes. Some have quantity regulations which prevent gluts and shortages by keeping the commodity moving in orderly fashion throughout the marketing season. Many orders and agreements also have marketing research and development authority, which permits them to set up projects to find new market outlets to improve marketing, to advertise, and to promote consumption.

63. AGRICULTURAL TRANSPORTATION

An efficient national transportation system is vital to market farm and food products effectively. Although the transportation system serving U.S. agriculture is highly developed, there are many complex and critical transportation issues that must be resolved for the system to work most effectively.

On January 1, 1991, USDA's Office of Transportation was incorporated into USDA' s Agricultural Marketing Service to improve the coordination of the Department's transportation and marketing policies. The result of the consolidation is AMS' Transportation and Marketing Division (TMD).

Some of the transportation issues the division is involved with are waterway user fees, the condition of rural roads and bridges, the impact on agriculture of rail and truck deregulation, and export promotion.

TMD conducts economic studies and analyses of domestic and international transportation systems, and represents agriculture and rural transportation interests in policy and regulatory forums. To provide direct assistance to the transportation community, the division conducts research and supplies technical assistance and information to producers, producer groups, shippers, exporters, rural communities, carriers, government agencies, and universities.

TMD also conducts technology-related research, usually in cooperation with industry, on such projects as improved handling and packaging for perishables, cryogenic refrigeration (use of carbon dioxide snow) for transporting frozen foods, new handling procedures for the air shipment of bees, and handling and regulatory requirements for shipment of livestock.

TMD addresses agricultural and rural development transportation policies and programs. It represents the interests of agriculture in transportation discussions with other government agencies to plan for rural highways and other transportation facilities.

In international transportation matters, TMD is concerned with maritime policies affecting the competitiveness of U.S. agricultural products worldwide and constraints in foreign ports that limit the import of U.S. products.

TMD has the responsibility for coordinating established bilateral discussions on issues involving U.S. agricultural exports to Mexico as part of a working group established under an agreement between the two countries. TMD also administers the Agreement on the International Carriage of Foodstuffs, an Economic Commission for Europe treaty. Other technical assistance programs on which TMD focuses involve improving transportation and distribution of agricultural commodities within Eastern Europe.

TMD also coordinates demonstration projects to improve national and international transport systems for agricultural products.

64. MARKET REGULATORY LAWS

Through its Agricultural Marketing Service, USDA administers and enforces regulatory laws that help make marketing more orderly and efficient.

The Perishable Agricultural Commodities Act establishes a code of trading ethics and encourages fair trading in the marketing of fresh and frozen fruits and vegetables. It prohibits unfair and fraudulent business practices and provides a forum to resolve contract disputes. Injured parties can collect damages from any buyer or seller who fails to live up to contract obligations.

The law also protects sellers of produce by imposing a trust on a buyer's inventory and receivables, which gives the seller a security interest in the product until payment is received.

The Federal Seed Act prohibits false labeling and advertising of seed in interstate commerce and complements seed laws of the 50 States by prohibiting the shipment of seed containing excessive noxious weed seeds.

The Plant Variety Protection Act extends patent-type protection to developers of plants that reproduce through seeds. Developers of new varieties of such plants as soybeans, wheat, corn, and marigolds apply to USDA for certificates of protection. USDA examiners determine whether the variety actually is novel and entitled to protection. The holders of certificates can turn to the courts to protect their "inventions" from exploitation by others.

The Agricultural Fair Practices Act enables farmers to file complaints with USDA if processors refuse to deal with them because they are members of a producer's bargaining or marketing association. This statute makes it unlawful for handlers to coerce, intimidate, or discriminate against producers because they belong to such an association. USDA helps to institute court proceedings when farmers' rights are found to be so violated.

Safe storage plays an important part in the orderly marketing of farm commodities because immediate sale is not always possible or advantageous.

Under the U.S. Warehouse Act, USDA operates a voluntary warehouse licensing system and a program of periodic examinations of licensed warehouses and their contents to help prevent deterioration and loss of stored products.

USDA also examines those warehouses that store goods owned by the Commodity Credit Corporation and on which CCC loans have been made.

65. MARKET NEWS

The Federal-State market news service, carried out by USDA's Agricultural Marketing Service (AMS) in cooperation with 41 State agencies, the District of Columbia, 3 territories, the U.S. Agency for International Development, and Agriculture Canada, reports up-to-the-minute information on prices, supply, and demand for most agricultural commodities.

This information aids producers, wholesalers, and others in the marketing chain in deciding where and when to buy or sell. The industry voluntarily provides the information on which market news reports are based.

Almost anywhere and any time trading in farm products goes on, Federal-State market news reporters are at work providing information about market conditions to the agricultural community.

Market news reporters gather data during visits to trading points and by telephone on qualities and quantities of the products sold, the prices paid, the demand, the movement, and the trends. From this information they develop timely, accurate, unbiased market reports for practically all agricultural commodities. They continually gather this information throughout every trading day and they get it out promptly to the waiting public.

The reports cover buying and selling of these commodity groupings: cotton and cottonseed; domestic fruits, vegetables, including truck rates; imported fruits and vegetables; floral products, and specialty crops; livestock, meat, poultry, eggs, grain, hay, feeds, and wool; dairy products; and tobacco.

AMS utilizes satellite communication, Earth stations, and microcomputers to compile 750 to 900 market news messages and reports each day. This totals approximately 50 million characters of information transmitted by satellite and received at 130 electronic terminals across the country daily.

News from California can be available in New York and points in between only minutes after it is released.

Automatic telephone answering devices are also used to disseminate market news. In 39 States a farmer or trader can dial a local number and receive a recorded message—updated several times a day—with the latest market news reports for a particular commodity in a specific area.

Market news reports also find their way into newspapers and magazines, radio and television, bulletin boards, and printed reports that are available on subscription.

Market news reporters gather and document information through personal observation of the transaction, talks to buyers and sellers, and checks on sales records. They must make sure to give an accurate picture of the market, because many people rely on their reports.

Like their fellow employees in standardization and grading work, market news reporters have to be experts on the commodities covered. Even if the product is not officially graded, the reporter must often report prices paid for the various qualities of products in terms of the nationally understood language, U.S. grades.

Only in this way can prices, supply, and demand be realistically compared from day to day and from market to market throughout the country.

Farmers and others who buy and sell farm products need to make these comparisons. They need market news in making decisions on how much and what kind of product to grow, on where and when to market, and on whether or not to accept a price bid.

This information helps to keep the marketing channels filled but not overflowing, preventing unnecessary and wasteful gluts and shortages, and helping provide consumers with a reliable and reasonably priced supply of foods to meet their daily needs.

Market news reports may help an Iowa hog grower, for instance, decide whether to ship the hogs to a terminal market, sell them at a nearby auction or direct buying station, or hold back for a few days if a heavy run is reported. Market reports in the local newspaper or on radio or television were likely provided by the Federal-State market news reporter.

Similar stories could be told about the need for market news for every other important farm commodity—and how this need is being met by the market news services.

Market news services are operated cooperatively with State departments of agriculture or, in the case of cotton, by a price quotations committee. AMS provides the centralized direction and coordination necessary to achieve nationwide uniformity and make the market news reports useful throughout the country.

66. FEDERAL GRADING PROGRAMS

USDA grading services and grade standards provide buyers and sellers with impartial appraisals of the quality of food and farm products being bought and sold. The buyer has the right to expect a particular quality from USDA Choice beef, USDA Grade A eggs, USDA AA butter, U.S. No. 2 yellow corn, or any other USDA-graded product. The seller has the right to expect a price commensurate with the quality of the product.

Grading Services

Two USDA agencies—the Agricultural Marketing Service (AMS) and the Federal Grain Inspection Service (FGIS)—provide voluntary grading services for most food and farm products. Some grading services provided by FGIS are mandatory.

Grading is performed by a well-trained staff of Federal and licensed graders. The users of Federal grading services—generally exporters, packers, elevator operators, or processors who request a service—are charged a fee.

During fiscal year 1989, USDA graded 65 percent of the federally inspected beef production in the United States, 50 percent of the total fresh fruits and vegetables, 39 percent of the shell eggs going to consumers, 95 percent of the butter, 55 percent of the frozen fruits and vegetables, 45 percent of the canned fruits and vegetables, 90 percent of the turkeys, and over 60 percent of the chickens and other poultry.

USDA also classed more than 97 percent of the cotton and inspected 95 percent of the tobacco produced in the United States.

In fiscal year 1990, the national grain inspection system conducted 2.8 million inspections of grains and oilseeds under the U.S. Grain Standards Act. In total, USDA inspected 294.7 million metric tons of the 340 million metric tons of grains, oilseeds, and rice that U.S. farmers produced in fiscal year 1990. Sixty-one percent of the grain inspected represented intrastate and interstate shipments.

Grade Standards

USDA grade standards help the buyer and seller understand quality levels. Ultimately, these standards assure consumers that their food is of a uniform and consistent quality.

Grade standards are continually evaluated by experts to ensure that they remain realistic and responsive and provide meaningful guidelines. Each year about 2 percent of the standards for some 240 food and farm products are revised to keep them consistent with current marketing practices. New standards also are developed as the need arises.

The number of grades for a particular product depends on the product's variability. There are six grades for corn and wheat, seven grades for milled rice, eight grades for beef, and three for turkey. Over 170 standards cover a wide range of fresh and packaged fruit and vegetable commodities.

Grading is used more often at the wholesale level than at the consumer level. Grade labeling of food products is not required by law.

67. FEDERAL GRAIN INSPECTION

The Federal Grain Inspection Service (FGIS) was established in 1976 as a separate agency in USDA to carry out the provisions of the U.S. Grain Standards Act. Congress charged the agency with establishing a nationwide system to ensure integrity in the inspection, weighing, and handling of U.S. grain, at both interior and export locations.

The orderly marketing of grain requires uniform descriptions—or grain standards—that are understood and accepted by buyers and sellers. To meet this need, official U.S. standards have been developed for 11 grains: corn, wheat, rye, oats, barley, flaxseed, sorghum, soybeans, sunflower seeds, triticale, and mixed grain.

U.S. grain standards are continuously reviewed and revised as necessary to meet current marketing needs and practices.

Most grain for export must be officially weighed. It must also be inspected for quality to be marketed under a U.S. grade, unless a waiver is obtained. The inspection and weighing of export grain must be performed by FGIS personnel, or by licensed employees of one of eight States that have been delegated this authority by FGIS.

The majority of inspections of grain handled at inland locations or sold in the domestic market are performed by private firms and State agencies designated by FGIS to provide official inspection service under FGIS supervision. Such inspection is provided on a request basis. Official weighing of grain sold in the domestic market also is performed on a request basis.

Fees for inspection and weighing are paid by those requesting services. Buyers or sellers at both export and inland markets who are not satisfied with the grades they receive can request a reinspection or an appeal inspection.

In addition to the inspection and weighing of grain, FGIS is also responsible, under the Agricultural Marketing Act of 1946, for inspection and weighing of rice, dry beans, peas, lentils, processed grain products, hops, and other assigned agricultural commodities. These services are available, upon request, on a fee basis.

68. MEAT, POULTRY, AND LIVESTOCK MARKETING REGULATIONS

The Packers and Stockyards (P&S) Act, administered by USDA's Packers and Stockyards Administration (P&SA), regulates marketing practices in the livestock, poultry, and meat industries. Specifically included are livestock markets (terminal and auction markets), livestock market agencies, livestock dealers, meat packers, and live poultry dealers.

The law prohibits unfair, deceptive, discriminatory, and monopolistic trade practices in regulated industries. It also provides financial protection for livestock producers.

The P&S Act encourages fair and open competition in the marketing of livestock, poultry, and meat to ensure that true market value is received. Livestock markets, buying stations, dealers, packers, and poultry processors subject to the act must maintain accurate scales and weigh livestock, poultry, and meats accurately.

69. FARMER COOPERATIVES

Farmers have large investments in all types of cooperatives. The Balance Sheet of the Farming Sector shows farmers' equity in these agriculturally related businesses was $26.1 billion at the beginning of 1990, a slight increase from $25.5 billion at the beginning of the preceding year. The average cooperative investment per farm is $12,000.

Four out of every five commercial farmers use cooperatives for one reason or another to market their products, provide their supplies, and procure needed services.

USDA's Agricultural Cooperative Service (ACS) surveys farmer cooperatives each year to measure marketing, farm supply, and service business activity. Statistics for 1989 show that 4,799 cooperatives transacted a business volume of $71.1 billion (excluding intercooperative business), up 7.0 percent from $66.4 billion in 1988. Net income was $1.85 billion, up 10.2 percent from $1.68 billion in 1988.

Memberships totaled 4.1 million, indicating many farmers belong to more than one cooperative. California leads all States in cooperative business volume with $7.4 billion. Iowa is second with nearly $5.7 billion, and Minnesota third with $5.4 billion.

State data for 1989 showed that Minnesota led all States in the number of cooperatives and memberships, with 467 cooperatives and 352,926 memberships. North Dakota was second in cooperatives with 342 and Texas third with 325. Wisconsin was second in number of memberships with 278,877 and Iowa third with 256,396.

Farmers market 26 percent of their raw products and, to varying degrees, process and package products through cooperatives. Dairy products led in volume of cooperative marketing business, with $18.3 billion. Grain and soybean products are second with $14.2 billion, fruits and vegetables third with $7.9 billion, and livestock products fourth, with $3.4 billion. Other products totaling $1 billion or more were: sugar, $1.8 billion; cotton, $1.9 billion; and poultry, $1.2 billion. Total marketing volume in 1989 was $52.6 billion, up 7.1 percent from 1988.

ACS estimates that about 24 percent of the major farm supplies bought by farmers are purchased from cooperatives. ACS figures for 1989 show cooperatives handled supplies totaling $16.6 billion, up 7.4 percent.

Petroleum products are the leading farm supply item, accounting for purchases of $4.8 billion. Feed accounted for $3.9 billion and fertilizer, $3.3 billion. Farmers obtained more than $1.9 billion worth of farm-related services through cooperatives.

ACS provides research, management analysis, and technical and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

ACS (1) helps farmers and other rural residents develop cooperatives to obtain supplies and services at lower cost, and get better prices for products they sell; (2) helps cooperatives improve services and operating efficiency; (3) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (4) encourages international cooperative programs.

ACS also publishes research and educational materials and publishes Farmer Cooperatives magazine monthly.

VIII. RESEARCH AND EDUCATION

70. AGRICULTURAL RESEARCH

Agricultural research provides new knowledge and technology to ensure an adequate supply of food and fiber for the Nation's population now and in the future. A basic goal of agricultural research is to establish low-cost resources for farmers to produce high-yielding quality commodities, enhance the environment, and conserve energy and natural resources.

Research has given farmers increased production, reduced production risks, and increased marketing efficiency. More specifically, it has led to the following:

- Genetically improved, high-quality, pest-resistant varieties of crops.
- An efficient and internationally competitive U.S agriculture with improved export opportunities.
- Development of new crops and new uses for traditional crops.
- Improved methods for conserving natural resources.
- Genetically improved livestock with higher reproduction rates.
- Efficient control of crop diseases, insects, nematodes, weeds, parasites, and other pests, including control of insects affecting humans and stored products.
- Control of livestock diseases and pests, and prevention of introduction of exotic diseases and pests.
- Greater understanding of the relationship between agricultural practices and water quality.
- Better plant and animal nutrition and reproduction.
- Better nutritional quality in foods and added food safety.
- Use and preservation of plant and animal germplasm.
- Improved irrigation equipment, principles, and practices.
- More efficient processing, transporting, and marketing of food.
- New and better fibers and fabrics.
- Improved standards of rural living.
- Support for programs of action and regulatory agencies.

The responsibility for much of the publicly funded agricultural research and development program lies with USDA's Agricultural Research Service (ARS) and Cooperative State Research Service (CSRS), and the cooperating land-grant system of State agricultural experiment stations (SAES).

There is a division of responsibility, however, in that USDA's primary intramural research agency is the ARS, while the primary extramural research agency is CSRS operating in cooperation with the SAES.

Intramural Agriculture Research and the ARS

ARS is the primary intramural research agency of USDA. It is committed to a balanced program of fundamental and applied research that concentrates on problems that are high risk, long range, and national or regional in scope.

In addition to 122 locations nationwide, ARS also maintains biocontrol laboratories in Argentina, France, Italy, and South Korea, a marketing laboratory in the Netherlands, and a work site in Mexico for research on insect pests.

The ARS program focuses upon six major objectives:

(1) managing and conserving the Nation's soil and water resources for a stable and productive agriculture;

(2) maintaining and increasing the productivity and quality of crop plants;

(3) increasing the productivity of animals and the quality of animal products;

(4) achieving maximum use of agricultural products for domestic markets and export;

(5) promoting optimum human health and well-being through improved nutrition and family resource management; and

(6) integrating scientific knowledge of agricultural production, processing, and marketing into systems that optimize effective management of resources and facilitate the transfer of technology to users.

The ARS program plan ensures that USDA research complements and supports, rather than duplicates, efforts of other organizations within the agricultural research system.

Current ARS priorities include:

- **Developing new and improved plant varieties.** Scientists are identifying growth processes through the use of cell culture and are trying to improve plants and animals by genetic engineering. They are also using more conventional plant breeding and genetic techniques and are developing new hormonal or regulator control of plant and animal growth.
- **Improving animal reproductive efficiency.** Progress is being made toward improved reproductive efficiency of meat and dairy animals, including twinning and multiple births in cattle. Reproductive rates could increase 100 percent.
- **Increasing animal production efficiency.** Scientists are investigating ways to make maximum use of livestock feedstuffs such as forages and concentrates. In addition, research to exploit gene transfer through the use of recombinant DNA molecules may lead to increased value of animals as food. Research on methods to prevent, control, or eliminate infectious diseases, internal parasites, and external parasites such as insects, ticks, and mites can bring significant increases in the efficiency of livestock production.
- **Using and preserving plant germplasm.** Unique collections and repositories of information and materials, developed and maintained by ARS, are essential in meeting national and international research needs and are heavily used by other public and private research organizations. They include facilities for plant germplasm introduction and preservation, clonal repositories, disease-free seed stock, the ARS Culture Collection, and taxonomic collections of plants, microbes, and insects. Germplasm variability is imperative if breeders are to

develop new, unique, and productive crops for ensuring a stable, plentiful supply of food, feed, and fiber with desirable quality.

- **Removing barriers to crop productivity**. Barriers to increased production of major domestic and export crops are being removed through the development of stress-tolerant varieties. Crop and soil management systems and weather data systems have been improved to facilitate agricultural decisionmaking and more efficient use of plant nutrients from fertilizers and organic materials.
- **Conserving soil, water, and air.** The goals of this research are to use water more efficiently, reduce pollution, improve fertilizer-use efficiency in plants, control erosion, restore productivity to eroded soils, and prevent water pollution.
- **Reducing effects of soil erosion on soil productivity.** Wind and water are slowly eroding our fertile topsoil. As the topsoil is depleted, the ability of the remaining soil to grow crops is reduced. Scientists are working to determine the impact that soil erosion has on crop production in this country and to develop ways to control erosion and restore productivity to eroded soils.
- **Controlling water quality.** Certain agricultural practices may lower downstream and subsurface water quality. To prevent this, scientists across the country are developing and testing economical farm management practices to control water pollution from agriculture.
- **Using energy efficiently.** Scientists are developing systems to reduce the amount of energy used in agriculture. In addition to conducting research on photosynthesis and nitrogen fixation, they are trying to increase fertilizer efficiency and find better methods of drying grain and curing peanuts and tobacco. Minimum tillage, irrigation efficiency, and increased forage production, are being studied.
- **Increasing plant and animal resistance to pests and environmental stresses.** Both plants and animals are subject to severe losses in productivity through stresses imposed by pests and adverse environmental factors. Losses can be markedly decreased by using improved cultural and management systems and genetically improved, stress-tolerant varieties and breeds.
- **Developing new pest control technology.** Even with today's sophisticated pest control technologies, more research is needed to reduce crop losses from insects and other pests. The role of insect migration in causing outbreaks is being studied along with the following:

-Chemistry of host plant resistance to attack,
-Animal host immunity to pests and diseases,
-Insect pathogens for control of major insect pests,
-Fate of fungicides in plants and animals,
-Regulation of insect hormone systems,
-Use of behavioral chemicals to increase effectiveness of beneficial insects,
-Development of new technology to control weeds, and
-Incorporation of all these components into a system of integrated pest management.

- **Controlling animal losses from diseases, parasites, and toxicants.** Diseases, internal and external parasites, and toxicants cause major losses of animals and are major contributors to low animal productivity. Research is needed to find new and improved methods of identifying losses, rapidly diagnosing recognized diseases, detecting inapparent carriers, and identifying new diseases. Recombinant DNA technology is expected to revolutionize the production of biological materials that are needed to prevent diseases or promote growth.
- **Increasing photosynthesis.** Scientists estimate that an increase of only 1 percent in photosynthetic efficiency would be of great importance in meeting food production goals.
- **Improving the ability of plants to capture or fix nitrogen.** For reasons of efficiency and environmental quality, scientists are working to find the best ways to use every pound of fertilizer and to improve the ability of certain plants to capture nitrogen from the air.
- **Improving nutritional quality of crops.** High-yielding cereals, legumes, and vegetables are sometimes deficient in nutritional content—such as protein, vitamins, minerals, and fiber. Improved quality in feed grains would greatly reduce the need for high-protein supplements in animal feed rations, releasing protein for other uses. A valuable goal of research will be to increase the vitamin content of foods and to improve blending of proteins.
- **Developing new industrial crops and nonfood uses for traditional agricultural commodities.** Research is finding ways to commercially develop several plants that produce industrial raw materials that can substitute for materials derived from non- renewable sources or that are normally imported. Kenaf, for example, is a fibrous plant that yields pulp suitable for making paper. More use of kenaf could help reduce imports of wood-pulp-derived newsprint and other paper. In another example, research has successfully found nonfood uses for commodities such as corn by substituting cornstarch for petroleum in the manufacture of plastics.
- **Reducing food losses.** Food losses occur at every level of the food chain, from production to home preparation to export. Scientists are developing biological methods to prevent and control such losses without harm to the quality and safety of the products. Additionally, research expands the marketing window for exports by reducing transportation and distribution losses of perishable commodities.
- **Producing more and better forage.** Research on forage could lead to improving livestock production capabilities on more than 900 million acres of marginal lands. If vegetation can be increased threefold, this land will support more than twice the number of cattle needed for the entire country.

Research areas being given special emphasis currently include maintaining or improving the environment, including groundwater quality; developing new uses and markets for agricultural commodities, thus enhancing the competitive posture of U.S. agriculture in the global marketplace; conserving and enhancing unique and diverse plant and animal germplasm; and improving the efficiency, and thus the profitability, of farming.

Extramural Agriculture Research and the CSRS and SAES

The interrelated and cooperative programs of CSRS and SAES cover research locations in all 50 States and in the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, Micronesia, and the Northern Marianas.

CSRS/SAES is committed to a balanced program of fundamental and applied research that concentrates on problems that are both high and low risk, long and short term, and local, regional, and national in scope.

The CSRS/SAES program plan focuses on the following six areas of concern:

1. **Natural resources and environment.** Research in this area concentrates on water quality and management, quality and productivity of soils and land use including sustainable agriculture, forests, rangelands and wildlife, biological and genetic diversity, and atmospheric and climatic change.
2. **Nutrition, food quality, and health.** Research in this area concentrates on optimal nutrition, food design and safety of foods, quality specifications in food processing and human health, food contaminants and microbial hazards, packaging and distribution methods, dietary patterns, health and behavior of the food consumer, new dimensions of nutritional and food science, and food biotechnology.
3. **New products, process, and value enhancement.** Research in this area concentrates on sensor technology in processing, bioengineering of processes antecedent to new product development, bioprocessing and computer information, management and control of new processes.
4. **Markets, trade, policy, and rural revitalization.** Research in these areas concentrates on markets and trade, economic performance, rural development, stability and well-being of families, youth, and elderly, impacts of new technologies on environment, people and communities, research and education policy for agriculture, and rural society.
5. **Plant systems.** Research in this area concentrates on plant and pest interactions, genomes, genetics and diversity, plant developmental biology, energy and metabolism in plants, ecology, and plant populations and plant production economics.
6. **Animal systems.** Research in this area concentrates on cellular growth, composition and development, the molecular basis of disease, genetics and reproduction, and animal production systems and economics.

These priority program areas coincide with those identified recently by the National Academy of Sciences when it made a recommendation for new competitive grants' funding for agricultural research. That recommendation led to a new authorization of $500 million per year in the 1990 farm bill for a National Research Initiative on Agriculture, Food, and Environment.

The National Research Initiative was funded for fiscal year 1991 at $73 million. Amounts for individual subject areas are $14 million for natural resources and the environment; $4 million for nutrition, food quality, and health; $35 million for plant systems; and $20 million for animal systems.

71. GLOBAL CHANGE RESEARCH INITIATIVE

Environmental change always has been a major consideration of the USDA. Adapting plants and management strategies to cope with changes in moisture, temperature, light, and soil variability requires knowledge of how specific plants and animals respond to change.

USDA has developed a strategic plan for assessing short- and long-term effects of potential global changes on all aspects of American agriculture and forestry.

The Department has also developed strategies for assessing how agriculture and forestry affect the global environment. USDA has developed a multidisciplinary scientific research agenda that can provide knowledge and technology to agriculture and forestry.

USDA recognizes that food and fiber production, processing, storage, and transportation activities add carbon dioxide and trace gases to the atmosphere.

USDA also recognizes that some measures to forestall potential changes to the environment must be started immediately while research on long-term consequences continues. Many of the short- term measures are the kinds of management activities that help sustain U.S. agriculture and forestry and would be important in any case, for example, afforestation, reforestation, minimum tillage, and increased crop residue use.

USDA programs on global change include many multidisciplinary linkages between plant and animal physiology and the ecosystem, between the ecosystem and management, between management and the costs and benefits, and between costs and benefits and agricultural policy.

Many USDA agencies participate directly in the USDA Global Change Research Program, including the Agricultural Research Service, Cooperative State Research Service, Extension Service, National Agricultural Library, Forest Service, Soil Conservation Service, Economic Research Service, World Agricultural Outlook Board, and Office of Energy.

In addition, the following USDA organizations serve in an advisory capacity to the Global Change Research Program: Office of Public Affairs, Office of Information Resources Management, Office of the General Counsel, and Office of Budget and Program Analysis.

USDA's budget for the global change initiative was $18.3 million for fiscal 1989, $21.1 million for fiscal 1990, and $38.6 million for fiscal 1991.

Fourteen research projects currently focus on global change research. It is anticipated that this will expand to approximately 22 projects by fiscal year 1992.

72. BIOTECHNOLOGY

Agricultural biotechnology is the application to agriculture of scientific breakthroughs in the field of molecular biology, including recombinant DNA technology and monoclonal antibody techniques. These new methods have been used to develop new varieties of plant and animal products with characteristics such as disease resistance and improved marketing qualities, and highly effective animal vaccines for use with diagnostic kits.

Scientists use agricultural biotechnology with a collection of laboratory techniques, such as genetic engineering, to improve plants, animals, and micro-organisms. Recent discoveries have led to virus-resistant crops such as cucumbers, tomatoes, and potatoes; better vaccines and diagnostic kits used for horses, chickens, and swine; and even new and improved varieties of commercial flowers.

USDA's role in agricultural biotechnology is to support research and to ensure that biotechnology products are developed safely. To help fulfill these objectives, several agencies participate in biotechnology activities: Agricultural Research Service (ARS), Cooperative State Research Service (CSRS), Forest Service (FS), Extension Service (ES), Animal and Plant Health Inspection Service (APHIS), Food Safety and Inspection Service (FSIS), National Agricultural Library (NAL), Office of International Cooperation and Development (OICD), and Foreign Agricultural Service (FAS).

The USDA Office of Agricultural Biotechnology (OAB) helps to coordinate the diverse programs and activities conducted by these agencies. The OAB also supports the Committee on Biotechnology in Agriculture, which provides a policy review mechanism for the Department. It is also OAB's responsibility to manage and support USDA's Agricultural Biotechnology Research Advisory Committee, which consists of more than a dozen experts in biotechnology who review the safety of certain research proposals.

Because safety of both people and the environment is a top priority at USDA, adopted regulations have been brought under authority of the Federal Plant Pest Act and Plant Quarantine Act, terms of which must be complied with before certain organisms or products can leave a laboratory and be tested in field plots.

These rules are managed and enforced by APHIS. In essence, they require that individuals obtain a permit before importing, moving interstate, or releasing certain plants and micro-organisms into the environment. Since 1987, when the regulations took effect, APHIS has issued more than 700 movement permits and 100 release permits for small-scale field tests. To date, no environmental problems have resulted from field tests of any of these organisms.

Another safety mechanism at USDA is a set of guidelines USDA-funded research agencies will use to help them assess biosafety and risk before approval of a field test may be granted. These guidelines are in the final state of clearance for publication in the Federal Register.

A third safety mechanism is called the National Biologic Impact Assessment Program, established under CSRS. One feature of this program is an electronic bulletin board with 14 databases that contain the latest information on biosafety, research, field tests, and regulations. The program has also developed a permit application generator which uses artificial intelligence to assist principal investigators in the design of safe field tests with plants, animals, and microbes.

Of course, safe field tests could not have begun without many years of laboratory research around the country. USDA's fiscal year 1990 budget for research using biotechnology was $110 million. At ARS, USDA's principal research agency, a few broad areas of investigation include ways of reducing and eliminating the effects of natural and artificial pollutants in soil and water; developing crops that adapt to drought, cold, heat, and toxic soil minerals; enhancing the effectiveness of beneficial insects; and improving the safety and quality of processed and unprocessed foods.

USDA's CSRS and FS also support research programs that use the new tools of biotechnology to improve agriculture.

CSRS, for example, supports research on cell fusion to produce a potato that resists various diseases. In light of the fact that the potato industry has lost an average $100 million to $200 million a year in the last 10 years due to the diseases, this is an important area of scientific investigation.

At the FS, scientists are combatting the gypsy moth, using biotechnology to put together a complex system of genetic messages that would instruct the young larvae to stop growing and reproducing.

The ES informs the agricultural sector and the public of regulations and evaluation systems used to verify the safety of products that result from biotechnological advances. ES provides access to information and education on how products and systems developed in concert with biotechnology can be used. Extension focuses on methods to enhance competitiveness of American agriculture, while helping to ensure production strategies are sustainable, environmentally sound, and socially acceptable.

Other USDA agencies are pursuing projects equally important to the advancement of agricultural biotechnology. These include analyzing the economic impacts of new technologies, preparing for the transfer of such technologies to various groups, and developing international exchanges and standards.

73. FUTURE AGRICULTURAL SCIENTISTS

America's food and agricultural system is one of its greatest success stories. Everyone uses the products of the U.S. science-based food and agricultural industry. The need for more cost-efficient production and the demand for agricultural products will grow in the years ahead as societal requirements for food and fiber increase and as production resources diminish. But these needs cannot be met without highly qualified scientists and professionals working to advance the frontiers of knowledge and technology. One of the most crucial variables in the food equation of the future is scientific and professional human capital.

The past decade has seen a resurgence of public interest in national strategies to rebuild the Nation's intellectual capital for conducting research in basic sciences, advancing technologies, strengthening national defense, and revitalizing America's economic competitiveness. Food and agricultural scientists comprise an integral sector of this human resource base.

Recognizing the significance of the foregoing and voicing strong concern over the diverse array of problems converging upon the Nation's college and university teaching programs in the food and agricultural sciences, the Congress enacted landmark legislation in 1977 designating the Department of Agriculture as the Federal Government's lead agency for higher education in the food and agricultural sciences. Specifically, the Food and Agriculture Act of 1977 (Public Law 95-ll3), as amended, charged the Department with strengthening the quality of the food and agricultural sciences higher education system and assuring the Nation of an adequate supply of food and agricultural scientific expertise.

Today, the USDA Office of Higher Education Programs (HEP) provides national leadership for a broad array of initiatives aimed at advancing the development of agriscience and business expertise. It sponsors a National Needs Graduate Fellowships Grants Program to stimulate the development of outstanding expertise in targeted shortage areas (biotechnology; bioprocessing or food/agricultural engineering; food, forest products, or agribusiness marketing; water science; and food science/human nutrition). The quality of scientific expertise emanating from this program promises to be outstanding and strongly attests to the value of a cooperative partnership between the higher education system, the USDA, and the Congress.

Higher Education Programs also manages two competitive grants programs to strengthen the quality of college and university teaching programs. One is the Higher Education Challenge Grants Programs, which provides support to colleges and universities to enhance curriculums, faculty competencies, student academic quality, experiential learning, and innovative instruction delivery systems. A second program provides support to the 1890 Land-Grant Institutions and Tuskegee University to advance the quality of their food and agricultural sciences teaching and research programs.

In addition, HEP works closely with representatives from academia, industry, and other Federal agencies to establish national priorities for food and agricultural sciences higher education and to develop cooperative Federal-State and public-private action agendas for achieving such priorities.

74. HUMAN NUTRITION RESEARCH AND EDUCATION

Increased interest in human nutrition research has resulted from a number of developments, including a growing conviction among policymakers that proper nutrition is a primary component in preventive health care and that a relationship exists between diet and some of the chronic degenerative diseases in the United States.

USDA has been involved in human nutrition research for many years. Authority for such research derived originally from the general mission mandated by Congress in establishing the Department through the Organic Act of 1862, signed into law by President Lincoln. Many authorizations since then have strengthened USDA's charge for nutrition research, including the National Agricultural Research, Extension, and Teaching Policy Act of 1977. It specifically included the words "human nutrition" in the Department's mission.

In 1984, USDA established a policy "to promote optimal human health and well-being through improved nutrition." Beginning in 1985 with preparation of the "Comprehensive Plan for a National Human Research and Education Program," USDA has reported annually to Congress on the status of its research.

Research in human nutrition is defined broadly to include research on specific nutrient requirements and food composition, the relation of diet to disease, food safety, and factors influencing nutritional practices, food choices, and consumption behavior. In-house research in human nutrition is conducted principally by two agencies of the U.S. Department of Agriculture—the Agricultural Research Service (ARS) and the Human Nutrition Information Service (HNIS).

Human nutrition research currently being conducted by ARS focuses on:

- **Human nutrition requirements.** Human requirements for protein, fat, carbohydrates, vitamins, and minerals must still be defined, especially for low-birthweight infants, pregnant teenagers, and the elderly.
- **Food composition.** Suitable methods are being devised for determining the composition of foods, including components other than nutrients of primary health significance. New methods are being developed for food sampling and reporting.
- **The role of trace elements.** Trace elements such as zinc, boron, and copper have particular functions in the diet. They include interaction with other dietary components such as fiber, physiological and biochemical influences as related to health according to age group, and the biological availability of minerals.
- **Dietary risk factors.** Research with human volunteers continues to define the role of dietary lipids, sugars, simple carbohydrates, and fibers in reducing the risk of diet-related disorders.
- **Nutritional effects during pregnancy, lactation, and early life.** Standards for nutrient intake and methods for assessing nutritional status are being developed for infants, children, and pregnant and lactating women. The role of diet in optimum growth and development is being studied.
- **Assessment of individual nutritional status.** Improved methods are being devised to identify marginal nutritional status and functional and biochemical changes related to suboptimal levels of nutrient intake.
- **Nutritional needs of the elderly.** Research is directed toward identifying the role of human nutrition in the aging process and in maintaining health throughout the lifespan.

HNIS focuses its research on:

- **Nutrient composition of foods.** HNIS compiles information and sponsors research to determine the amounts of about 60 components in the thousands of foods Americans consume. The information is presented in books and in machine-readable forms.
- **Nutrition monitoring.** HNIS monitors the dietary status of the population at three levels: U.S. food supply, household food use, and individual food intakes. National surveys provide the household and individual data. Analysis of the data addresses important issues in food assistance and nutrition education.
- **Nutrition education.** HNIS coordinates the development of the Dietary Guidelines for Americans, which is published jointly by USDA

and the Department of Health and Human Services. Research supports the development and promotion of the Guidelines and other dietary guidance for healthy Americans.

75. NATIONAL AGRICULTURAL STATISTICS

An orderly production and marketing system depends on an accurate and current accounting of potential output, available stocks, and the other factors that influence agriculture.

The National Agricultural Statistics Service (NASS), through its Washington, DC, headquarters and 45 field offices serving all States, annually publishes hundreds of reports detailing production and prospects for crops, livestock, dairy, and poultry. Other releases outline stocks, prices, labor, weather, and similar items concerning farmers and ranchers and those associated with agriculture.

Geared toward producers, this information can help them plan their planting, feeding, breeding, and marketing programs. The data also are used by agricultural services and businesses, trade groups, and financial organizations to determine needed inputs, resources, transportation, and storage-related crop and livestock products.

Information for these continuing series of estimates is gathered from those most closely involved, the producers. Contact is made by mail survey and telephone and personal interview. For such major crops as corn, cotton, wheat, and soybeans, special on-the-spot counts and measurements of plant development are made in a cross-section of fields throughout the Nation.

All the raw indications from these varied sources are summarized by the NASS office serving that State and sent to the agency's Agricultural Statistics Board in Washington, DC, which sets and issues the official estimates for the State and Nation.

All reports are released at scheduled times, and the information is readily available to the public, in printed form through the Agricultural Statistics Board and the Government Printing Office. The information is available electronically through the Department's Computerized Information Delivery (CID) System.

76. AGRICULTURAL ECONOMICS

USDA's Economic Research Service (ERS) researches and analyzes various topics related to agriculture and rural America. Production and marketing of major commodities is one area of study. Analysts make projections for supply, demand, and use of specific crops, dairy products, and livestock. They predict farm income and food prices.

Another major area of research is foreign agriculture and trade. Economists assess foreign developments and agricultural policies to determine their impact on U.S. foreign agricultural trade.

Use, conservation, and development of natural resources as they affect economic growth are covered, along with the impacts of technology.

ERS economists examine rural population, employment, and housing trends, and rural people's economic adjustment problems.

Performance of the agricultural industry, including the production, processing, and marketing sectors, is another important area that ERS routinely assesses.

77. AGRICULTURAL INFORMATION—THE NATIONAL AGRICULTURAL LIBRARY

Information is a vital factor in improving agricultural products and productivity. The Nation's consumers, farmers, and agricultural administrators, researchers, and educators need facts, figures, and findings to make the best decisions. The effective information service gathers, processes, and delivers current and complete information when and as needed.

As its basic mission, the National Agricultural Library (NAL) serves the USDA and the Nation as information provider for agriculture. Responding to priorities set by the Department and by the Congress, NAL provides general information services and at the same time operates 15 information centers focusing on special subject areas. The centers ensure provision of information to their particular clientele, using the resources and current technology applications being developed by the library.

A primary resource is the library's collection consisting of 2 million books, journals, and other materials from all parts of the world on all aspects of agriculture, including plant science, horticulture, forestry, animal industry, veterinary science, entomology, aquaculture, soil science, chemistry, biotechnology, food and nutrition, alternative farming, agricultural products, agricultural trade and marketing, and rural sociology.

A resource providing access to the agricultural literature at NAL and other locations is the Agriculture Online Information Access (AGRICOLA) database prepared by NAL. With more than 2,600,000 citations, AGRICOLA is available both online and on compact disc (CD-ROM).

User services range from reference and referrals to production of specialized bibliographies and computer database searches. General reference services are provided at the library or may be requested by regular mail or by telephone. (FTS 8-344-4479 or [301] 344-4479)

State-of-the-art technology has made available new products and services for preserving and delivering information and for instruction. NAL continues to develop expert advisory systems which help users obtain answers to questions, imitating human experts. Systems for the subjects of aquaculture, human nutrition, and herbs, among others, guide inquirers to relevant information.

The NAL is using a scanning system to convert printed text of agricultural publications to digitized code which is stored electronically on laser optical disks. The purpose is to provide indepth access to the literature of agriculture and at the same time preserve it from the rapid deterioration affecting most of the world's printed matter.

The full text and associated graphics of some USDA and State Extension publications are available on digital videodisc. Each word of the text can be searched. The user can interact directly with a new computer-laser disk system called AGRICOLearn to learn how to search the AGRICOLA online database. The student works at his/her own pace, accessing only the parts of the course needed. Video pictures, graphics, and voice provide interest.

NAL has placed 50,000 photos and images from the collections of the Forest Service and the USDA Photography Division on two 12-inch laser videodiscs.

A search on an attached computer easily and quickly identifies photos on subjects, places, or persons of interest, bringing them up on the video screen. The originals need not be handled unless needed.

These "high tech" systems for the retrieval and preservation of agricultural information can be seen at NAL's New Technology Demonstration Center.

NAL has also established two software demonstration centers. One, in the Food and Nutrition Information Center, currently holds over 150 software programs for dietary analysis, food service, and nutrition and consumer education. The second holds about 70 software packages in other areas of agriculture and related subjects, including general purpose software with applications in the agricultural community.

The software is available for review and evaluation by NAL users. NAL provides a Current Awareness Literature Service (CALS) offering periodic computer searches of current literature to USDA scientists and researchers on a reimbursable basis. Searches are based on areas of interest as specified by requesting scientists and technicians.

Books, journal articles, and other materials are provided to USDA employees in response to job-related requests. Photocopies rather than loans of journal articles are supplied. NAL will also lend books and provide photocopies to other libraries according to standard interlibrary loan policies and procedures.

Information on NAL products and services is available through Agricultural Library Forum (ALF), NAL's electronic bulletin board.

ALF supports messaging and conferencing, bulletins, and file transfer. Dial ALF on FTS 8-344-8510 or (301) 344-8510, 8511, 5496, or 5497.

NAL conducts orientations and software or technology demonstrations upon request for those interested in learning how to use the library and its services. Call FTS 8-344-3778 or (301) 344-3778. Training programs in using AGRICOLA and other NAL products and services can be arranged for USDA employees. Call FTS 8-344-3875 or (301) 344-3875.

78. COOPERATIVE EXTENSION SYSTEM

USDA's Extension Service is the Federal partner of the Cooperative Extension System, a national educational network linking research, science, and technology to the needs of people where they live and work. Extension's focus is education—practical education for Americans to use in dealing with the critical issues that affect their daily lives and the Nation's future.

Extension education combines the expertise and resources of Federal, State, and local governments. The partners in this unique System are:

- The Extension Service at the U.S. Department of Agriculture.

- Extension professionals at land-grant colleges and universities (sometimes called land-grant institutions) throughout the United States and its territories.
- Extension professionals in nearly all of the Nation's 3,150 counties.

In addition, thousands of paraprofessionals and nearly 3 million volunteers support this partnership and magnify its impact. The Cooperative Extension System's strong linkages with other public and private groups enhance and expand educational activities.

Through an interactive strategic planning process, Extension educational programs and resources target today's critical national issues and will continue to address the critical concerns of Americans. Current issues addressed as national initiatives include:

- **Competitiveness of American agriculture.** Extension uses its research-based information to help the United States retain its competitive edge in world markets by increasing profitability throughout the food and fiber system.
- **Food quality and safety.** The quality, safety, and composition of food are major concerns of both the food industry and consumers, and Extension targets programs to the specific needs of both groups.
- **Revitalization of rural America.** In cooperation with local governments and other organizations, Extension education programs address ways of achieving the full potential of rural areas.
- **Water quality.** Extension programs help consumers, chemical users, and local policymakers understand the causes and effects of water pollution and work to achieve an atmosphere of cooperation between varied interests in the water quality area.
- **Youth at risk.** America faces a youth crisis that crosses social, cultural, and economic barriers so that all youth are at risk, and the Cooperative Extension System is committed to helping lead the drive to assist youth at risk.
- **Waste management.** An emerging national initiative, the management of human and other waste products is a targeted critical national issue that encompasses both decreasing disposal space and increasing concerns of waste material impacts on the environment and its natural resources.

Nationwide, Extension professionals in agriculture, natural resources, home economics, human nutrition, rural and community development, and 4-H and youth programs focus their educational programs on these current initiatives.

Communication and use of electronic technology are crucial to today's Extension programs. Computer networks, satellite communications, and other emerging technologies already affect the ways Extension delivers programs. Staffs nationwide will continue to use these and other applicable technologies to target and reach interested audiences more efficiently and effectively.

Established in 1914, the Cooperative Extension System was designed as a partnership of the U.S. Department of Agriculture and the land-grant universities, which were authorized by the Federal Morrill Acts of 1862 and 1890. Legislation in various States has enabled local governments or organized groups in the Nation's counties to become a third party in this educational endeavor.

Today, this educational system includes professionals in each of America's 1862 land-grant colleges and universities (in the 50 States, Puerto Rico, the Virgin Islands, Guam, Northern Marianas, American Samoa, Micronesia, and the District of Columbia) and in Tuskegee University and sixteen 1890 land-grant colleges or universities.

79. SMALL-SCALE AGRICULTURE

Small-scale agriculture implies people using alternative farm systems to earn some money. Small-scale agriculture, sometimes referred to as "small farms," constitutes a significant number of the Nation's 2.1 million farms.

When farms grossing less than $50,000 annually are defined as "small," then more than 7 out of 10 U.S. farms are classified as small.

Awareness is growing that small-scale farmers make a significant contribution to the economic development of both agribusiness and consumer industries of rural communities throughout the United States. Some say such people are the "mortar" providing rural communities with social and economic strengths. USDA's Office for Small-Scale Agriculture (OSSA) was created as part of the Cooperative State Research Service to increase and improve the flow of information about small-scale farming to agricultural producers and consumers. It is a focal point for distribution of USDA resources on this subject. The Office functions as a liaison to other USDA agencies such as the Extension Service and the Agricultural Research Service. It identifies and directs research and educational programs to improve usefulness of information received by all small-scale farmers and others wishing to join their ranks. Ongoing and planned activities of the OSSA include:

- Newsletter. Published quarterly, "Small-Scale Agriculture Today" provides information on small-scale agriculture with a focus on relevant topics, technology, and calendar events.
- Factsheets. A series of 15 factsheets, each involving "A Small-Scale Agriculture Alternative," are currently available. Titles are DESSERT VINES, EXOTIC FRUITS, EXOTIC LIVESTOCK, FOLIAGE PLANTS, GOATS, HERBS, MUSHROOMS, SHEEP, SPECIALTY FLOWERS, SPECIALTY VEGETABLES, WILDFLOWERS, WOODLOTS, BEEKEEPING, AQUACULTURE, and STRAWBERRIES. Others are in preparation.
- Directory. Published in July 1989, "The Directory for Small-Scale Agriculture" lists 500 Federal and State experts in research and education and enables users to access information on small-scale agriculture through networking. Copies (stock no. 001-000-04539-3) are available at $5.50 from the Superintendent of Documents, Government Printing Office, North Capitol Street, NW, Washington, DC 20402. Or call the Order Desk, (202) 783-3238.
- A 9-minute color video promoting diversification. "The Perfect Tomato, The Ideal Blackberry, Making Money in Small-Scale Agriculture" costs $10 (make check payable to OPA, Photography Division). Write to

USDA, Office of Public Affairs, Photography Division, Room 4404, South Building, Washington, DC 20250-1300.

- Research and Education. OSSA assesses ongoing USDA research and educational efforts that target small-scale agriculture.
- Conferences. OSSA regularly monitors and/or implements conferences on small-scale agriculture.

APPENDIX I. USDA TABLES OF AGRICULTURAL ECONOMICS

The tables were prepared mainly by economists of USDA's Economic Research Service.

Table 18.—U.S. rural population, 1950, 1960, 1970, 1980, 1986, 1988, and 1990[1]

[In millions]

	Total	Nonfarm	Farm[2]
Previous farm definition:			
1950	54.5	31.5	23.0
1960	54.0	38.4	15.6
1970	53.9	44.2	9.7
Current definition:			
1980	59.5	53.4	6.1
1986	63.1[3]	57.9[3]	5.2
1988	64.8[3]	59.8[3]	5.0
1990	67.0[3]	62.4[3]	4.6

[1] Rural population includes all persons living in the open country and in towns of less than 2,500 inhabitants.

[2] Farm under the previous definition consisted of persons on places of 10 or more acres if at least $50 worth of farm products were sold in the reporting year, and places under 10 acres with $250 worth of sales. Under the current definition, the farm population consists of persons living on places with annual sales of agricultural products of $1,000 or more.

[3] These estimates are from the Current Population Survey and are not fully comparable to the decennial census counts for earlier years.

Table 19.—U.S. agriculture's capacity to produce, 1951, 1956, 1961, 1966, and 1971-89

Year		Farms (thousands)	Farm population[1]		Work-hours[2]		Crops		Livestock		Overall
	Number	Change from preceding year	Thousands	Proportion of U.S. Population (pct)	Total used (millions)	Output per work-hour index 1977=100	Production volume index 1977=100	Production per acre index 1977=100	Production volume index 1977=100	Production per breeding unit index 1977=100	Farm output 1977=100
1951	5,428	-220	21,890	14.2	18,300	24	60	59	73	68	63
1956	4,515	-140	18,712	11.1	15,200	31	63	64	79	73	69
1961	3,825	-138	14,803	8.1	11,800	44	70	78	86	84	76
1966	3,257	-99	11,595	5.9	9,200	59	73	83	91	91	79
1971	2,902	-47	9,425	4.6	7,500	85	86	96	100	98	92
1972	2,860	-42	9,610	4.6	7,600	83	87	99	101	100	91
1973	2,823	-37	9,472	4.5	7,500	86	92	99	99	97	93
1974	2,795	-28	9,264	4.4	7,500	81	84	88	100	96	88
1975[3]	2,521	([4])	8,864	4.2	7,300	90	93	96	95	92	95
1976	2,497	-24	8,253	3.9	6,900	97	92	94	99	98	97
1977	2,456	-41	7,806	3.6	6,900	100	100	100	100	100	100
1978	2,436	-20	6,501	3.0	6,900	104	102	105	101	102	104
1979	2,437	10	6,241	2.8	6,800	113	113	113	104	104	111
1980	2,440	3	6,051	2.7	6,600	109	101	100	108	107	104
1981	2,440	0	5,850	2.6	6,600	123	117	115	109	108	118
1982	2,407	-33	5,628	2.4	6,400	125	117	116	107	108	116
1983	2,379	-28	5,787	2.5	6,700	99	88	100	109	112	96
1984	2,334	-45	5,754	2.4	6,365	121	111	112	107	113	112
1985	2,293	-41	5,355	2.2	5,872	139	118	120	110	120	118
1986	2,250	-43	[3]5,226	2.2	5,521	139	109	116	110	121	111
1987	2,213	-37	[3]4,986	[3]2.0	5,359	142	108	123	113	127	110
1988	2,197	-16	[3]4,951	[3]2.0	5,218	134	92	106	116	129	102
1989	2,173	-24	4,301	1.9	5,281	148	[5]107	[5]119	[5]116	[5]131	[5]114

[1] Starting 1978, based on new farm definition.
[2] Work-hours based on new labor series.
[3] New definition of farm began in 1975.
[4] Not available for 1975; change in farm definition precludes comparison with 1974 farm numbers.
[5] Estimated.

Table 20.—Agricultural prices, farm incomes, assets, and exports, 1951, 1956, 1961, 1966, and 1971-90

Year	Parity ratio[1]		In agriculture[2]	Assets of proprietors[2,3]			Harvested crop acreage			
	Unadjusted (pct)	Adjusted (pct)	Farm operators' net income from farming	Total assets (billion dollars)	Total liabilities (billion dollars)	Proprietors' equities (billion dollars)	Total (million acres)	Domestic use per capita (acres)	For export (million acres)	Value of agricultural exports (million dollars)
			Aggregate (billion dollars)							
1951	107	108	15.9	135.7	12.5	123.1	344	1.73	59	4,053
1956	83	84	11.3	145.2	15.9	129.3	324	1.52	60	4,728
1961	79	83	12.0	182.4	24.1	158.3	302	1.26	67	5,142
1966	79	85	14.0	235.1	39.2	195.9	294	1.14	69	6,771
1971	71	75	15.0	301.4	53.2	248.1	305	1.17	62	8,242
1972	74	79	19.5	339.7	58.7	281.0	294	.97	91	14,984
1973	91	94	34.4	418.5	67.6	350.9	321	1.06	96	21,608
1974	86	87	27.3	448.7	75.9	372.9	328	1.07	99	21,854
1975	76	76	25.6	510.2	85.0	425.2	336	1.09	100	22,760
1976	71	72	20.2	590.5	96.1	494.4	337	1.10	97	23,974
1977	66	68	19.9	653.1	110.9	542.2	345	1.06	112	27,289
1978	70	72	25.2	769.4	127.4	642.0	338	1.00	114	31,979
1979	71	72	27.4	897.6	151.6	746.0	348	.99	125	40,481
1980	65	65	16.1	983.0	166.8	816.2	352	.94	137	43,780
1981	60	62	26.9	982.4	182.3	800.1	366	1.03	129	39,097
1982	55	57	23.5	945.2	189.5	755.7	362	1.07	113	34,769
1983	56	57	12.7	950.1	192.7	757.4	306	.77	124	38,027
1984	58	59	32.2	807.2	189.9	617.4	348	1.06	96	31,201
1985	52	55	32.4	728.3	173.9	544.3	342	1.10	81	26,312
1986	51	56	38.0	690.1	154.1	535.9	325	.95	96	27,876
1987	51	58	47.1	719.1	142.0	577.2	302	.80	106	35,334
1988	54	60	45.7	763.5	127.6	625.9	298	.72	121	39,668
1989	55	59	49.0	793.9	135.6	658.3				40,000
1990[4]				818.0	134.0	684.0				

[1] Ratio of index of prices received to index of prices paid, interest, taxes, and wage rates—1910-14=100.
[2] Numbers based on new farm definition beginning in 1975.
[3] December 31 numbers, excluding farm households.
[4] Forecast.

Table 21.—Leading States, commodities, for cash receipts, including net Commodity Credit Corporation loans, 1989

Commodities	United States		Top 10 States by their value of cash receipts									
	Rank	Value	1	2	3	4	5	6	7	8	9	10
		Million dollars	State and million dollars									
Total		159,173	CA 17,515	TX 10,760	IA 9,119	NE 8,521	IL 6,710	MN 6,526	KS 6,324	FL 6,203	WI 5,278	NC 4,551
Livestock & poultry	1	83,724	TX 6,863	NE 5,643	IA 5,209	CA 5,093	WI 4,337	KS 4,245	MN 3,716	AR 2,661	CO 2,649	PA 2,595
Crops	2	75,449	CA 12,422	FL 4,982	IL 4,458	IA 3,911	TX 3,897	NE 2,878	MN 2,809	IN 2,502	WA 2,438	OH 2,114
Cattle and calves	1	36,676	TX 5,050	NE 4,634	KS 3,753	CO 2,233	IA 2,027	OK 1,844	CA 1,505	SD 1,456	MN 1,063	MO 927
Dairy products	2	19,401	WI 3,183	CA 2,431	NY 1,556	PA 1,453	MN 1,305	TX 739	MI 694	OH 609	WA 556	IA 537
Corn	3	11,116	IL 1,992	IA 1,916	NE 1,592	IN 1,119	MN 801	OH 578	TX 349	MO 325	KS 295	CO 274
Soybeans	4	10,837	IL 1,820	IA 1,780	MN 975	IN 896	MO 755	OH 735	AR 525	NE 475	KS 295	MS 287
Hogs	5	9,426	IA 2,421	IL 984	MN 811	NE 723	IN 700	NC 509	MO 475	OH 383	SD 335	KS 268
Broilers	6	8,780	AR 1,469	GA 1,250	AL 1,134	NC 848	MS 594	TX 483	DE 458	MD 449	CA 361	VA 297
Greenhouse and nursery	7	7,295	CA 1,586	FL 956	TX 477	PA 288	OR 279	NY 262	MI 254	NJ 233	OK 224	NC 214
Wheat	8	7,185	KS 898	ND 629	OK 580	WA 495	MT 391	IL 372	ID 335	MN 298	MO 290	CO 273
Cotton	9	4,740	TX 1,491	CA 1,086	AZ 486	MS 476	LA 252	AR 241	TN 142	AL 124	GA 111	OK 92
Eggs	10	3,854	CA 402	GA 286	IN 281	PA 257	AR 237	TX 223	NC 222	OH 183	AL 153	FL 122
Hay	11	3,407	CA 658	CO 165	TX 163	KS 161	WA 133	MT 120	ID 114	NE 114	AZ 113	NM 100

Table 21.—Leading States, commodities, for cash receipts, including net Commodity Credit Corporation loans, 1989—Continued

Commodities	United States		Top 10 States by their value of cash receipts									
	Rank	Value	1	2	3	4	5	6	7	8	9	10
		Million dollars	State and million dollars									
Tobacco	12	2,381	NC 946	KY 638	SC 178	VA 160	TN 148	GA 146	FL 30	OH 29	MD 21	IN 21
Potatoes	13	2,288	ID 587	WA 299	CA 166	WI 154	ME 152	CO 135	FL 128	ND 93	OR 90	MN 88
Turkeys	14	2,222	NC 407	MN 290	CA 249	AZ 169	MO 144	VA 134	IN 126	IA 73	PA 72	CO 71
Tomatoes	15	1,824	CA 809	FL 741	OH 45	VA 41	SC 25	PA 20	NY 19	IN 18	NJ 16	MI 16
Oranges	16	1,814	FL 1,316	CA 472	AZ 16	TX 10	n.a	n.a	n.a	n.a	n.a	n.a.
Grapes	17	1,718	CA 1,551	WA 69	NY 39	AZ 18	PA 16	MI 11	OR 6	OH 2	GA 2	AR 2
Sorghum grain	18	1,143	KS 351	TX 342	NE 193	MO 68	AR 46	OK 34	NM 22	CO 18	IL 15	SD 14
Apples	19	1,125	WA 494	CA 103	NY 96	MI 80	PA 43	VA 38	OH 31	NC 26	MA 20	WV 20
Peanuts	20	1,119	GA 494	AL 157	TX 136	NC 111	VA 74	OK 63	FL 59	NM 13	SC 12	AZ 1
Sugarbeets	21	1,037	MN 240	ID 175	CA 169	ND 124	MI 92	WY 51	NE 50	MT 46	CO 38	TX 28
Lettuce	22	950	CA 670	AZ 190	FL 36	CO 10	WA 8	TX 8	NY 7	NM 6	OH 5	NJ 5
Cane for sugar	23	884	FL 433	HI 215	LA 209	TX 27	n.a	n.a	n.a	n.a	n.a	n.a.
Rice	24	869	AR 357	CA 180	TX 120	LA 111	MS 76	MO 25	n.a	n.a	n.a	n.a.
Barley	25	750	ND 165	ID 130	MT 111	MN 91	WA 68	CA 36	CO 34	OR 25	SD 22	WY 13

n.a. = not applicable.

Table 22.—Income of farmers and farm people from all sources, 1945-89

(In billions of dollars—unless otherwise noted)

Year	Cash receipts from marketings	Government payments to farmers	Gross cash income[1]	Noncash income from farming[2]	Gross farm income after inventory adjustment[3]	Off-farm income[4]	Total production expenses	Net farm income after inventory adjustment	Total for family personal spending and investment[5]	Number farms (millions)[6]
1945	21.7	.74	22.4	3.4	25.4		13.1	12.3	12.3	5.97
1946	24.8	.77	25.6	4.0	29.6		14.5	15.1	15.1	5.93
1947	29.6	.31	29.9	4.2	32.4		17.0	15.4	15.4	5.87
1948	30.2	.26	30.5	4.2	36.5		18.8	17.7	17.7	5.80
1949	27.8	.19	28.0	3.6	30.8		18.0	12.8	12.8	5.7
1950	28.5	.28	28.8	3.5	33.1		19.5	13.6	13.6	5.65
1951	32.9	.29	33.2	3.7	38.3		22.3	15.9	15.9	5.4
1952	32.5	.28	32.9	4.0	37.8		22.8	15.0	15.0	5.20
1953	31.0	.21	31.3	3.7	34.4		21.5	13.0	13.0	4.9
1954	29.8	.26	30.2	3.5	34.2		21.8	12.4	12.4	4.80
1955	29.5	.23	29.8	3.4	33.5		22.2	11.3	11.3	4.6
1956	30.4	.55	31.1	3.3	34.0		22.7	11.3	11.3	4.51
1957	29.7	1.02	30.9	3.3	34.8		23.7	11.1	11.1	4.37
1958	33.5	1.09	34.8	3.4	39.0		25.8	13.2	13.2	4.23
1959	33.6	.68	34.6	3.3	37.9		27.2	10.7	10.7	4.10
1960	34.0	.70	35.0	3.2	38.6	8.5	27.4	11.2	19.7	3.96
1961	35.2	1.49	36.9	3.3	40.5	9.2	28.6	12.0	21.2	3.83
1962	36.5	1.75	38.5	3.3	42.3	9.9	30.3	12.1	22.0	3.69
1963	37.5	1.70	39.5	3.3	43.4	11.0	31.6	11.8	22.8	3.57
1964	37.3	2.18	39.8	3.3	42.3	11.6	31.8	10.5	22.1	3.46
1965	39.4	2.46	42.2	3.3	46.5	12.7	33.6	12.9	25.6	3.36
1966	43.4	3.28	47.1	3.4	50.5	13.9	36.5	14.0	27.9	3.26
1967	42.8	3.08	46.4	3.5	50.5	14.5	38.2	12.3	26.8	3.16
1968	44.2	3.46	48.2	3.6	51.8	15.5	39.5	12.3	27.8	3.07
1969	48.2	3.79	52.5	3.8	56.4	16.6	42.1	14.3	30.9	3.00

Table 22.—Income of farmers and farm people from all sources, 1945-89—Continued

(In billions of dollars—unless otherwise noted)

Year	Cash receipts from marketings	Government payments to farmers	Gross cash income[1]	Noncash income from farming[2]	Gross farm income after inventory adjustment[3]	Off-farm income[4]	Total production expenses	Net farm income after inventory adjustment	Total for family personal spending and investment[5]	Number farms (millions)[6]
1970	50.5	3.72	54.8	4.0	58.8	17.6	44.5	14.4	32.0	2.95
1971	52.7	3.14	56.5	4.2	62.1	19.1	47.1	15.0	34.1	2.90
1972	61.1	3.96	65.7	4.6	71.1	21.3	51.7	19.5	40.8	2.86
1973	86.9	2.61	90.2	5.3	98.9	24.7	64.6	34.4	59.1	2.82
1974	92.4	.53	93.7	6.1	98.2	28.1	71.0	27.3	55.4	2.80
1975	88.9	.81	90.7	6.5	100.6	23.9	75.0	25.5	49.4	2.52
1976	95.4	.73	97.2	7.3	102.9	26.7	82.7	20.2	46.9	2.50
1977	96.2	1.82	99.3	8.4	108.8	26.1	88.9	19.9	46.0	2.46
1978	112.4	3.03	117.3	9.3	128.4	29.7	103.2	25.2	54.9	2.44
1979	131.5	1.37	135.1	10.6	150.7	33.8	123.3	27.4	61.2	2.44
1980	139.7	1.29	143.3	12.3	149.3	34.7	133.1	16.1	50.8	2.44
1981	141.6	1.93	146.0	13.8	166.3	35.8	139.4	26.9	62.7	2.44
1982	142.6	3.49	150.6	14.3	163.5	36.4	140.0	23.5	59.9	2.41
1983	136.6	9.30	150.6	13.5	153.2	37.0	137.9	15.3	52.3	2.38
1984	142.8	8.43	155.5	8.7	170.2	39.2	143.8	26.3	65.5	2.33
1985	144.1	7.71	157.2	8.0	162.9	55.2	131.9	31.0	86.2	2.29
1986	135.2	11.81	152.0	6.9	156.5	54.5	125.5	31.0	85.5	2.25
1987	141.7	16.75	164.3	7.5	169.0	56.9	127.7	41.3	98.2	2.21
1988	150.2	14.48	170.4	7.5	173.8	57.7	132.1	41.8	99.5	2.20
1989	159.2	10.89	177.5	7.3	189.2	57.5	142.6	46.7	104.2	2.17

[1] includes cash income from recreation, machine hire and custom work, and forest product sales.

[2] Noncash income includes gross value of farm products used on the farm, and a rental value for farm dwellings.

[3] Gross income from farming does allow for an increase or decrease in value of inventories.

[4] Includes nonfarm wages, salaries, interest, dividends, rental property, unemployment compensation, social security, etc., but does not include capital gains income from off farm sources. Data not collected for years, 1945-59.

[5] Net income from farming after change in value of farm inventory, plus off-farm income of farm operator families.

[6] Per farm numbers based on new farm definition beginning in 1977.

Table 23.—Wheat: Area, yield, supply, disappearance, and prices, 1960-90[1]

Year beginning June 1	Area (1,000 acres)		Yield per harvested acre (bu)	Supply (mil bu)				Disappearance (mil bu)			Prices received by farmers (dol per bu)
	Planted	Harvested		Beginning stock	Production	Imports[2]	Total	Domestic use	Exports[1]	Total	
1960	54,906	51,879	26.1	1,384	1,355	8	2,747	591	654	1,245	1.74
1961	55,707	51,571	23.9	1,502	1,232	6	2,741	604	716	1,320	1.83
1962	49,274	43,688	25.0	1,421	1,092	5	2,518	599	649	1,248	2.04
1963	53,364	45,506	25.2	1,270	1,147	4	2,421	581	846	1,427	1.85
1964	55,672	49,762	25.8	993	1,283	2	2,279	635	723	1,358	1.37
1965	57,361	49,560	26.5	921	1,316	1	2,238	725	852	1,577	1.35
1966	54,105	49,613	26.3	660	1,305	2	1,967	683	771	1,454	1.63
1967	67,264	58,353	25.8	513	1,508	1	2,021	626	765	1,391	1.39
1968	61,860	54,765	28.4	630	1,557	1	2,188	740	544	1,284	1.24
1969	53,450	47,146	30.6	904	1,443	3	2,350	764	603	1,367	1.25
1970	48,739	43,564	31.0	983	1,352	1	2,336	772	741	1,513	1.33
1971	53,822	47,685	33.9	823	1,619	1	2,442	849	610	1,459	1.34
1972	54,913	47,303	32.7	983	1,546	1	2,531	799	1,135	1,934	1.76
1973	59,254	54,148	31.6	597	1,711	3	2,311	753	1,217	1,970	3.95
1974	71,044	65,368	27.3	340	1,782	3	2,125	672	1,018	1,690	4.09
1975	74,900	69,499	30.6	435	2,127	2	2,584	726	1,173	1,899	3.56
1976	80,395	70,927	30.3	666	2,149	3	2,817	754	950	1,704	2.73
1977	75,410	66,686	30.7	1,113	2,046	2	3,161	859	1,124	1,983	2.33
1978	65,989	56,495	31.4	1,178	1,776	2	2,955	837	1,194	2,031	2.98
1979	71,424	62,454	34.2	924	2,134	2	3,060	783	1,375	2,158	3.80
1980	80,788	71,125	33.5	902	2,381	3	3,285	783	1,514	2,296	3.99
1981	88,251	81,642	34.5	989	2,785	3	3,777	847	1,771	2,618	3.69
1982	86,232	77,937	35.5	1,159	2,765	8	3,932	908	1,509	2,417	3.45
1983	76,419	61,390	39.4	1,515	2,420	4	3,939	1,114	1,426	2,540	3.51
1984	79,213	66,928	38.8	1,399	2,595	9	4,003	1,156	1,421	2,578	3.39
1985	75,575	64,734	37.5	1,425	2,424	16	3,866	1,051	909	1,961	3.08
1986	72,068	60,723	34.4	1,905	2,091	21	4,017	1,197	999	2,196	2.42
1987	65,834	55,945	37.7	1,821	2,108	16	3,945	1,086	1,598	2,684	2.57
1988	65,829	53,189	34.1	1,261	1,812	23	3,096	975	1,419	2,394	3.72
1989	76,615	62,189	32.7	702	2,037	23	2,762	992	1,233	2,225	3.72
1990	77,286	69,353	39.5	536	2,739	35	3,310	1,303	1,025	2,328	2.55-2.65[3]

[1] 1990 preliminary.
[2] Imports and exports include flour and other products expressed in wheat equivalent.
[3] Projected.

Table 24.—Corn (grain only): Area, yield, supply, disappearance, and prices, 1960-89[1]

Marketing year[2]	Area (1,000 acres)		Yield per harvested acre (bu)	Supply (mil bu)				Disappearance (mil bu)			Prices received by farmers (dol per bu)
	Planted for all purpose	Harvested for grain		Beginning stock	Production	Imports[3]	Total	Domestic use	Exports[3]	Total	
1960	81,425	71,422	54.7	1,787	3,907	1	5,696	3,387	292	3,679	1.00
1961	65,919	57,634	62.4	2,016	3,598	1	5,615	3,527	435	3,962	1.10
1962	65,017	55,726	64.7	1,653	3,606	1	5,260	3,479	416	3,895	1.12
1963	68,771	59,227	67.9	1,365	4,019	1	5,385	3,348	500	3,848	1.11
1964	65,823	55,369	62.9	1,537	3,484	1	5,022	3,305	570	3,875	1.17
1965	65,171	55,392	74.1	1,147	4,103	1	5,251	3,722	687	4,409	1.16
1966	66,347	57,002	73.1	842	4,168	1	5,011	3,698	487	4,184	1.24
1967	71,156	60,694	80.1	826	4,860	1	5,687	3,885	633	4,518	1.03
1968	65,126	55,980	79.5	1,169	4,450	1	5,620	3,966	536	4,502	1.08
1969	64,264	54,574	85.9	1,118	4,687	1	5,806	4,189	612	4,801	1.16
1970	66,863	57,358	72.4	1,005	4,152	4	5,161	3,978	517	4,495	1.33
1971	74,179	64,123	88.1	667	5,646	1	6,314	4,392	796	5,187	1.08
1972	67,126	57,513	97.0	1,127	5,580	1	6,708	4,742	1,258	6,000	1.57
1973	72,253	62,143	91.3	708	5,671	1	6,380	4,653	1,243	5,896	2.55
1974	77,935	65,405	71.9	484	4,701	2	5,187	3,677	1,149	4,826	3.02
1975	78,719	67,625	86.4	558	5,841	2	6,400	4,103	1,664	5,767	2.54
1976	84,588	71,506	88.0	633	6,289	2	6,925	4,144	1,657	5,789	2.15
1977	84,328	71,614	90.8	1,136	6,505	2	7,643	4,311	1,909	6,207	2.02
1978	81,675	71,930	101.0	1,436	7,268	1	8,705	4,882	2,124	6,995	2.25
1979	81,394	72,400	109.5	1,710	7,928	1	9,638	5,203	2,415	7,604	2.48
1980	84,043	72,961	91.0	2,034	6,639	1	8,675	4,891	2,408	7,282	3.12
1981	84,097	74,524	108.9	1,392	8,119	1	9,511	4,978	2,010	6,975	2.47
1982	81,857	72,719	113.2	2,537	8,235	1	10,772	5,428	1,834	7,249	2.55
1983	60,207	51,479	81.1	3,523	4,174	2	7,699	4,806	1,902	6,693	3.21
1984	80,517	71,897	106.7	1,006	7,672	2	8,680	5,182	1,865	7,032	2.63
1985	83,398	75,209	118.0	1,648	8,875	10	10,534	5,267	1,241	6,494	2.23
1986	76,580	68,907	119.4	4,040	8,226	2	12,267	5,893	1,504	7,385	1.50
1987	66,200	59,505	119.8	4,882	7,131	4	12,016	6,041	1,728	7,757	1.94
1988	67,717	58,250	84.6	4,259	4,929	3	9,191	5,232	2,053	7,260	2.54
1989	72,221	64,703	116.3	1,930	7,525	2	9,458	5,745	2,405	8,113	2.36

[1] Revised data, 1979-82.
[2] Marketing year beginning October 1, 1960 to 1974; September 1 marketing year from 1975 to date.
[3] Grain and grain equivalent of corn products.

Table 25.—Soybeans: Area, yield, supply, disappearance, and prices, 1960-90[1]

Year beginning Sept 1	Area (1,000 acres)		Yield per harvested acre (bu)	Supply (mil bu)			Disappearance (mil bu)			Total	Prices received by farmers (dol per bu)
	Planted	Harvested		Beginning stock	Production	Total	Seed, feed residual	Exports	Crushed for oil (mil bu)		
1960	24,440	23,655	23.5	51.8	555.1	606.9	39	134.7	406.1	579.8	2.13
1961	27,787	27,003	25.1	27.1	678.6	705.7	47	149.4	431.4	627.4	2.28
1962	28,418	27,608	24.2	78.3	669.2	747.5	48	180.5	472.8	701.5	2.34
1963	29,462	28,615	24.4	46.0	699.2	745.2	54	187.2	436.8	677.9	2.51
1964	31,721	30,793	22.8	67.3	700.9	768.2	47	212.2	479.0	738.5	2.62
1965	35,227	34,449	24.5	29.7	845.6	875.3	52	250.6	537.5	839.7	2.54
1966	37,294	36,546	25.4	35.6	928.5	964.1	53	261.6	559.4	874.0	2.75
1967	40,819	39,805	24.5	90.1	976.4	1,066.6	57	266.6	576.4	900.2	2.49
1968	42,265	41,391	26.7	166.3	1,107.0	1,273.3	53	286.8	605.9	946.4	2.43
1969	42,534	41,337	27.4	326.8	1,133.1	1,460.0	58	432.6	737.3	1,230.1	2.35
1970	43,082	42,249	26.7	229.8	1,127.1	1,356.9	64	433.8	760.1	1,258.2	2.85
1971	43,476	42,705	27.5	98.8	1,176.1	1,274.9	65	416.8	720.4	1,202.9	3.03
1972	46,866	45,683	27.8	72.0	1,270.6	1,342.6	12	479.4	721.8	1,282.9	4.37
1973	56,549	55,667	27.8	59.6	1,546.5	1,607.2	77	539.1	821.3	1,436.4	5.68
1974	52,479	51,341	23.7	170.8	1,216.3	1,387.0	77	420.7	701.3	1,198.9	6.64
1975	54,590	53,617	28.9	188.2	1,548.4	1,735.5	71	555.1	865.1	1,490.6	4.92
1976	50,269	49,401	26.1	244.9	1,288.6	1,532.5	77	564.1	790.2	1,429.6	6.81
1977	58,978	57,830	30.6	102.9	1,767.3	1,865.7	82	700.5	926.7	1,703.7	5.88
1978	64,708	63,663	29.4	161.2	1,868.7	2,031.2	87	739.2	1,857.2	1,017.8	6.66
1979	71,411	70,343	32.1	176	2,261	2,437	81	875	1,123	2,079	6.28
1980	69,930	67,813	26.5	358	1,798	2,156	99	724	1,020	1,843	7.57
1981	67,543	66,163	30.1	313	1,989	2,302	89	929	1,030	2,048	6.17
1982	70,884	69,442	31.5	254	2,190	2,444	86	905	1,108	2,099	5.71
1983	63,779	62,525	26.2	345	1,636	1,981	79	743	983	1,805	7.83
1984	67,755	66,113	28.1	176	1,861	2,037	93	598	1,030	1,721	5.84
1985	63,145	61,599	34.1	316	2,099	2,415	86	740	1,053	1,879	5.05
1986	60,405	58,312	33.3	536	1,943	2,479	106	757	1,179	2,042	4.78
1987	58,180	57,172	33.9	436	1,938	2,374	96	802	1,174	2,072	5.88
1988	58,840	57,373	27.0	302	1,549	1,855	88	527	1,058	1,673	7.42
1989	60,820	59,538	32.3	182	1,924	2,109	101	623	1,146	1,870	5.70
1990[2]	57,795	56,502	34.0	239	1,922	2,163	98	565	1.180	1,843	5.40-6.00

[1] Revised data, 1984-88.
[2] Estimated as of February.

Table 26.—Cotton (all kinds): Area, yield, supply, disappearance, and prices, 1964-90

Marketing year[1]	Area (1,000 acres)		Yield per harvested acre (pounds)	Supply (1,000 bales)				Disappearance (1,000 bales)			Prices received by farmers[2] cents per (pound)
	Planted	Harvested		Beginning stock	Production	Imports	Total	Domestic mill use	Exports	Total	
1964	14,835	14,055	517	12,351	15,144	118	27,613	9,261	4,195	13,456	31.0
1965	14,152	13,615	527	14,249	14,951	118	29,318	9,596	3,035	12,631	29.3
1966	10,349	9,552	480	17,028	9,555	105	26,688	9,574	4,832	14,406	21.7
1967	9,448	7,997	447	12,344	7,443	149	19,936	9,077	4,361	13,438	26.7
1968	10,912	10,160	516	6,584	10,925	68	17,577	8,332	2,825	11,157	23.1
1969	11,882	11,058	434	6,544	9,990	52	16,586	8,114	2,878	10,992	22.0
1970	11,945	11,155	438	5,843	10,192	37	16,072	8,204	3,897	12,101	22.9
1971	12,355	11,471	438	4,203	10,477	72	14,752	8,259	3,385	11,644	28,2
1972	14,001	12,984	507	3,258	13,704	34	16,996	7,769	5,311	13,080	27.3
1973	12,480	11,970	520	4,221	12,974	48	17,243	7,472	6,123	13,595	44.6
1974	13,679	12,547	441	3,808	11,540	34	15,382	5,860	3,926	9,786	42.9
1975	9,478	8,796	453	5,708	8,302	92	14,102	7,250	3,311	10,561	51.3
1976	11,636	10,914	465	3,681	10,581	38	14,300	6,674	4,784	11,458	64.1
1977	13,680	13,275	520	2,928	14,389	5	17,322	6,483	5,484	11,967	52.3
1978	13,375	12,400	420	5,347	10,856	4	16,207	6,352	6,180	12,532	58.4
1979	13,978	12,831	547	3,958	14,629	5	18,592	6,506	9,229	15,735	62.5
1980	14,534	13,215	404	3,000	11,122	27	14,149	5,891	5,926	11,817	74.7
1981	14,330	13,841	542	2,668	15,646	26	18,340	5,264	6,567	11,831	54.3
1982	11,345	9,734	590	6,632	11,963	20	18,615	5,512	5,207	10,719	59.4
1983	7,926	7,348	508	7,937	7,771	12	15,721	5,928	6,786	12,714	66.4
1984	11,145	10,379	600	2,775	12,982	25	15,781	5,540	6,215	11,755	57.8
1985	10,685	10,229	630	4,102	13,432	33	17,567	6,399	1,960	8,359	56.3
1986	10,045	8,468	552	9,348	9,731	3	19,082	7,452	6,684	14,136	52.4
1987	10,397	10,030	706	5,026	14,760	2	19,788	7,617	6,582	14,199	64.3
1988	12,515	11,948	619	5,771	15,411	5	21,187	7,782	6,148	13,930	56.6
1989	10,587	9,538	614	7,092	12,196	2	19,290	8,759	7,694	16,453	65.6
1990[3]	12,429	11,709	640	3,000	15,617	5	18,622	8,400	8,000	16,400	([4])

---

[1] Marketing year beginning August 1.

[2] Upland cotton, weighted season average price received by farmers.

[3] Estimated.

[4] USDA is prohibited by law from publishing cotton price forecasts.

Table 27.—Cattle and calves: Inventory numbers, calf crop, disposition, production, and prices, 1960-91[1]

Year	Inventory Jan. 1[2] (1,000 head)	Calf crop (1,000 head)	Inshipments (1,000 head)	Marketings[2] (1,000 head)		Farm slaughter[3] (1,000 head)	Deaths (1,000 head)		Production[4] (1,000 lb)	Marketings[5] (1,000 lb)	Price per 100 pounds (dollars)	
				Cattle	Calves	Cattle and calves	Cattle	Calves			Cattle	Calves
1960	96,236	39,355	13,477	34,254	12,034	1,195	1,567	2,533	28,795,880	35,722,510	20.40	22.90
1961	97,700	40,180	14,761	35,138	11,898	1,218	1,532	2,486	29,902,448	36,821,343	20.20	23.70
1962	100,369	41,441	16,583	36,403	12,182	1,194	1,583	2,542	30,774,859	37,668,658	21.30	25.10
1963	104,448	42,268	16,182	37,863	11,918	1,213	1,560	2,480	32,776,777	40,033,778	19.90	24.00
1964	107,903	43,809	15,595	40,280	12,552	1,242	1,595	2,637	34,836,138	42,655,520	18.00	20.40
1965	109,000	43,928	17,464	43,482	12,603	1,196	1,641	2,607	34,002,808	44,623,119	19.90	22.00
1966	108,862	43,537	18,624	45,038	12,488	665	1,625	2,424	34,949,625	46,284,623	22.20	26.00
1967	108,783	43,803	18,597	44,781	12,365	622	1,533	2,512	36,122,064	46,684,824	22.30	26.30
1968	109,371	44,315	19,509	45,860	12,742	568	1,527	2,485	36,530,247	47,494,093	23,40	27.60
1969	110,015	45,177	19,942	45,559	12,598	486	1,532	2,591	37,146,953	47,194,719	26.20	31.60
1970	112,369	45,871	20,059	46,926	12,036	462	1,583	2,714	39,342,987	49,459,720	27.10	34.50
1971	114,578	46,738	22,673	49,143	12,086	456	1,634	2,808	39,434,379	50,685,799	29.00	36.40
1972	117,862	47,682	24,831	51,043	12,164	503	1,780	3,346	41,225,193	53,141,798	33.50	44.70
1973	121,539	49,194	24,133	48,369	11,652	570	2,099	4,388	44,231,455	51,022,731	42.80	56.60
1974	127,788	50,873	18,103	48,383	9,514	729	2,006	4,104	42,760,575	50,208,435	35.60	35.20
1975	132,028	50,183	20,095	54,331	12,253	750	2,396	4,596	40,878,016	54,877,016	32.30	27.20
1976	127,980	47,384	21,238	54,410	12,525	722	1,821	3,369	41,368,299	57,169,770	33.70	34.20
1977	122,810	45,931	23,241	56,342	12,722	700	2,000	4,000	40,829,023	58,426,941	34.50	36.90
1978	116,375	43,818	23,573	54,622	11,952	550	1,940	3,860	39,766,559	57,381,035	48.50	59.00
1979	110,864	42,596	22,322	48,358	10,151	430	1,900	3,700	38,803,335	51,874,758	66.10	88.70
1980	111,242	44,938	20,513	46,026	10,502	401	1,795	3,618	40,283,777	50,210,836	62.40	76.80
1981	114,351	44,666	18,914	46,647	10,383	398	1,700	3,359	41,178,209	50,896,754	58.60	64.00
1982	115,444	44,200	21,289	49,549	10,560	395	1,843	3,586	40,714,722	53,272,291	56.70	59.80
1983	115,001	43,885	19,210	48,089	10,443	410	1,877	3,617	40,301,302	51,990,001	55.50	61.70
1984	113,360	42,470	20,515	50,862	10,253	388	1,873	3,591	40,030,471	54,644,756	57.30	59.90
1985	109,582	41,050	19,864	49,243	10,530	370	1,701	3,345	40,157,633	54,483,633	53.70	62.10
1986	105,378	41,182	21,211	49,963	10,498	351	1,738	3,300	40,464,719	55,398,117	52.60	61.10
1987	102,118	40,152	22,222	49,232	10,423	330	1,700	3,100	40,327,023	54,449,464	61.10	78.50
1988	99,622	40,293	22,061	47,949	10,211	280	1,650	2,000	40,617,645	53,671,675	66.60	89.20
1989	98,065	40,102	21,608	46,360	10,522	240	1,546	2,925	40,051,116	52,449,763	69.50	90.80
1990	98,162	39,879										
1991	99,436											

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths and onhand and of year equals total of births, inshipments, and onhand beginning of year. Includes Alaska and Hawaii beginning 1961. [2] All cattle and calves. [3] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial meat production estimates beginning with January 1966. Combined beginning 1961. [4] Adjustments made for inshipments and changes in inventory. [5] Excludes interfarm sales.

Table 28.—Hogs: Inventory numbers, pig crop, disappearance, and prices, 1960-90[1]

Year	Inventory Dec.1[2] (1,000 head)	Pig crop (1,000 head)	Inshipments (1,000 head)	Marketings[3] 1,000 head)	Farm slaughter[4] (1,000 head)	Deaths (1,000 head)	Production[5] (1,000 lb)	Marketing[3] (1,000 lb)	Price per 100 pounds (dollars)
1960	59,026	88,216	2,500	79,831	5,114	9,223	19,203,234	18,622,151	15.30
1961	55,560	92,713	2,293	80,326	4,639	8,984	20,166,822	18,917,418	16.60
1962	56,619	93,608	2,639	81,743	4,093	9,037	20,274,620	19,310,335	16.30
1963	57,993	94,056	2,657	86,163	3,795	7,991	20,960,460	20,273,936	14.90
1964	56,757	87,544	2,718	86,088	3,269	6,872	20,216,732	20,487,965	14.80
1965	56,106	78,941	2,364	78,127	2,678	6,089	18,252,141	18,426,743	19.60
1966	50,519	87,604	2,489	75,761	1,375	6,351	19,148,989	17,773,114	23.50
1967	57,125	91,668	2,855	85,258	1,301	6,273	20,636,444	19,948,881	19.10
1968	58,818	94,156	3,181	87,728	1,262	6,338	21,034,221	20,381,499	18.50
1969	60,829	88,676	3,092	88,074	1,134	6,343	20,600,325	20,708,223	22.20
1970	57,046	101,714	3,211	86,919	1,235	6,532	21,822,826	20,347,354	22.70
1971	67,285	97,924	3,639	98,644	1,210	6,584	22,832,335	23,147,614	17.50
1972	62,412	90,574	3,360	89,555	1,158	6,617	20,918,802	20,922,577	24.10
1973	59,017	88,123	3,902	82,419	1,095	6,914	20,154,425	19,606,900	38.40
1974	60,614	83,744	3,979	85,504	1,321	6,819	19,976,384	20,299,581	34.20
1975	54,693	71,186	3,806	73,959	1,193	5,631	16,798,843	16,980,920	46.10
1976	49,267	84,395	4,191	75,744	1,175	6,001	18,110,651	17,085,365	43.30
1977	54,934	86,162	4,258	80,917	1,145	6,754	19,124,424	18,409,468	39.40
1978	56,539	88,442	4,713	81,428	1,099	7,067	19,610,887	18,749,389	46.60
1979	60,356	102,792	5,003	92,499	1,070	7,265	22,617,129	21,485,876	41.80
1980	67,318	101,720	4,668	100,651	1,100	7,494	23,401,728	23,473,775	38.00
1981	64,462	93,853	4,147	95,986	895	6,883	21,812,966	22,258,979	43.90
1982	58,598	85,189	3,827	86,972	655	5,552	19,657,921	20,154,962	52.30
1983	54,534	93,155	3,527	89,129	517	4,875	21,195,347	20,834,899	46.80
1984	56,694	86,586	3,527	87,344	473	4,917	20,195,699	20,490,921	47.10
1985	54,073	86,029	3,696	86,694	446	4,345	20,164,269	20,360,970	44.00
1986	52,313	82,283	3,463	86,608	358	4,133	19,362,696	19,362,696	49.30
1987	50,920	88,347	3,746	83,857	328	4,208	20,408,228	19,943,130	51.20
1988	54,384	92,883	3,642	90,334	337	4,768	21,669,577	21,626,216	42.30
1989	55,469	92,074	3,621	92,311	315	4,469	21,849,658	22,078,566	42.50
1990	53,821	90,087							

---

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths, and onhand end of year equals totals of births, inshipments, and onhand beginning of year. Includes Alaska and Hawaii beginning 1981. [2] All hogs and pigs. Beginning with 1865 number onhand is estimate as of December 1 previous year. [3] Excludes interfarm sales. [4] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial meat production estimates beginning with January. [5] Adjustments made for inshipments and changes in inventory.

Table 29.—Sheep and lambs: Inventory numbers, lamb crop, disposition, production, and prices, 1962-91[1]

Year	Inventory Jan.1[2] (1,000 head)	Lamb crop (1,000 head)	Inshipments (1,000 head)		Marketings[3] (1,000 head)		Farm slaughter[4] (1,000 head)		Deaths (1,000 head)		Production[5] (1000lb)	Marketings[3] (1,000 lb)	Price per 100 pounds (dollars)	
			Sheep	Lambs	Sheep	Lambs	Sheep	Lambs	Sheep	Lambs			Sheep	Lambs
1962	30,969	19,712	636	5,198	3,788	18,783	113	218	2,430	2,007	1,490,722	2,074,148	5.63	17.80
1963	29,176	18,516	620	4,962	3,720	17,956	113	212	2,268	1,889	1,393,141	2,002,402	5.76	18.10
1964	27,116	16,994	736	4,838	3,437	16,757	107	193	2,265	1,797	1,330,507	1,860,420	6.00	19.90
1965	25,127	16,312	5,165		2,454	15,213	294		2,199	1,711	1,217,139	1,639,762	6.34	22.80
1966	24,734	15,881	4,679		2,785	14,674	268		940	1,674	1,249,097	1,651,261	6.84	23.40
1967	23,953	15,017	4,030		2,911	13,993	245		1,980	1,649	1,153,596	1,603,247	6.35	22.10
1968	22,223	14,443	4,035		2,298	13,448	237		1,789	1,580	1,166,190	1,487,480	6.58	24.40
1969	21,350	13,723	4,119		2,282	12,873	233		1,826	1,556	1,065,074	1,446,504	8.10	27.20
1970	20,423	13,465	4,032		1,983	12,840	249		1,638	1,478	1,099,385	1,435,918	7.52	26.40
1971	19,731	12,998	4,004		2,202	12,627	236		1,482	1,446	1,070,502	1,447,047	6.56	25.90
1972	18,739	12,599	3,976		2,170	12,383	224		1,417	1,480	1,004,102	1,411,461	7.26	29.10
1973	17,641	11,500	3,275		2,198	10,879	202		1,386	1,441	895,776	1,278,090	12.90	35.10
1974	16,310	10,509	2,629		2,172	9,888	217		1,248	1,409	806,755	1,177,539	11.20	37.00
1975	14,515	9,857	2,343		1,771	8,997	212		1,081	1,343	781,120	1,072,665	11.30	42.10
1976	13,311	8,888	2,466		1,445	8,071	197		983	1,202	732,765	961,780	13.20	46.90
1977	12,766	8,606	2,173		1,504	7,405	198		910	1,181	703,942	896,568	13.40	51.30
1978[6]	12,322	8,020	2,151		1,470	6,606	174		905	1,117	696,929	856,668	21.70	62.70
1979	12,365	7,974	2,143		1,347	6,336	172		867	1,063	704,593	806,765	25.70	66.70
1980	12,699	8,257	2,216		1,395	6,743	166		894	1,026	746,343	854,830	21,30	63.60
1981	12,947	8,820	1,885		1,510	7,103	189		818	1,035	772,382	885,634	21.20	54.90
1982	12,997	8,580	2,115		2,124	7,358	195		815	1,060	785,425	1,017,918	19.50	53.10
1983	12,140	8,209	1,838		1,820	7,140	171		674	934	767,553	966,515	15.70	53.90
1984	11,487	7,788	1,859		1,821	7,007	141		792	929	694,116	944,552	16.40	60.10
1985	10,443	7,412	1,693		1,569	6,478	135		544	839	694,217	868,942	23.90	67.70
1986	9,983	7,356	1,792		1,310	6,084	128		498	777	721,464	809,588	25.60	69.00
1987	10,389	7,190	1,814		1,232	6,024	113		503	736	728,863	799,111	29.50	77.60
1988	10,945	7,206	1,518		1,566	5,939	99		514	695	707,148	825,734	25.60	69.10
1989	10,858	7,725	1,634		997	6,534	98		502	730	777,658	825,277	24.40	66.10
1990	11,368	7,701												
1991	11,200													

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths, and onhand end of year equals total of births, inshipments, and onhand beginning of year. Includes Alaska beginning 1961; Hawaii not available. [2] All sheep and lambs. [3] Excludes interfarm sales. [4] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial estimates beginning with January 1966. [5] Adjustments made for inshipments and changes in inventory. [6] Excludes inventory and supply and disposition items for Alabama, Arkansas, Delaware, Florida, Georgia, Mississippi, Rhode Island, and South Carolina, and is comparable to other supply and disposition items for 1978. Actual Jan. 1, 1978, inventory is 12,369,000 head.

Table 30.—Milk: Supply, utilization, and prices, 1960-90[1]

Year	Average number of milk cows[2] (1,000 head)	Milk production per cow[3] (lb)	Supply (mil lb)				Utilization (mil lb)			Prices received by farmers for all milk (dol. per cwt)	Milk feed ration[5]
			Beginning stocks	Production	Imports	Total	Domestic disappearance	Export and shipments[4]	Total		
1960	17,515	7,029	4,167	123,109	604	127,880	121,451	1,029	122,480	4.21	1.45
1961	17,243	7,290	5,400	125,707	760	131,867	121,032	932	121,964	4.22	1.45
1962	16,842	7,496	9,903	126,251	795	136,949	123,075	1,718	124,793	4.09	1.40
1963	16,260	7,700	12,156	125,202	915	138,273	123,092	5,493	128,585	4.10	1.36
1964	15,677	8,099	9,688	126,967	830	137,485	124,741	7,454	132,195	4.15	1.38
1965	14,953	8,305	5,290	124,180	923	130,393	123,579	2,358	125,937	4.23	1.40
1966	14,071	8,522	4,456	119,912	2,791	127,159	121,092	1,208	122,300	4.81	1.53
1967	13,415	8,851	4,859	118,732	2,908	126,499	117,423	824	118,247	5.02	1.55
1968	12,832	9,135	8,252	117,225	1,780	127,257	118,852	1,771	120,623	5.24	1.69
1969	12,307	9,434	6,634	116,108	1,621	124,363	117,699	1,419	119,118	5.49	1.74
1970	12,000	9,751	5,245	117,007	1,874	124,126	117,333	960	118,323	5.71	1.74
1971	11,839	10,015	5,803	118,566	1,346	125,715	117,585	3,026	120,611	5.87	1.71
1972	11,700	10,259	5,104	120,025	1,694	126,823	119,178	2,147	121,325	6.07	1.72
1973	11,413	10,119	5,498	115,491	3,860	125,849	119,350	1,292	120,642	7.14	1.46
1974	11,230	10,293	5,207	115,586	2,923	123,716	116,672	1,158	117,830	8.33	1.34
1975	11,139	10,360	5,886	115,398	1,669	122,953	118,063	1,046	119,109	8.75	1.40
1976	11,032	10,894	3,844	120,180	1,943	125,967	119,231	1,027	120,258	9.66	1.53
1977	10,945	11,206	5,709	122,654	1,968	130,331	120,713	992	121,705	9.72	1.57
1978	10,803	11,243	8,626	121,461	2,310	132,397	122,690	978	123,668	10.60	1.74
1979	10,734	11,492	8,729	123,350	2,305	134,384	124,765	1,020	125,785	12.02	1.80
1980	10,799	11,891	8,599	128,406	2,109	139,114	125,167	988	126,155	13.05	1.76
1981	10,898	12,183	12,959	132,770	2,329	148,058	125,897	3,783	129,680	13.77	1.72
1982	11,011	12,306	18,378	135,505	2,477	156,360	130,695	5,611	136,306	13.61	1.83
1983	11,059	12,622	20,054	139,588	2,616	162,258	135,847	3,765	139,612	13.58	1.72
1984	10,793	12,541	22,646	135,351	2,741	160,738	139,800	4,234	144,034	13.46	1.65
1985	10,981	13,024	16,704	143,012	2,776	162,492	143,426	5,371	148,797	12.75	1.73
1986	10,773	13,285	13,695	143,124	2,732	159,551	144,167	2,517	146,684	12.50	1.79
1987	10,327	13,819	12,867	142,709	2,490	158,066	147,590	3,036	150,626	12.54	1.86
1988	10,262	14,145	7,440	145,152	2,394	154,986	145,219	1,533	146,752	12.26	1.58
1989	10,126	14,244	8,234	144,239	2,498	154,971	142,615	3,561	146,176	13.56	1.65
1990[6]	10,126	14,642	8,795	148,284	2,690	159,769	145,119	1,660	146,779	13.75	1.72

[1] Supply-utilization data, milk equivalent fat solids bases. [2] Average number on farms during the year; heifers that have not freshened excluded. [3] Excludes milk sucked by calves. [4] Includes sales for dollars, government-to-government sales P.L. 480, and AID programs. Exports only beginning 1988. [5] Pounds of average concentrate ration equal in value to 1 pound of milk. [6] Preliminary.

Table 31.—Number of farms and land in farms, by State, June 1, 1988-90[1]

	Land in farms			Farms		
	1988	1989	1990[2]	1988	1989	1990[2]
	1,000 Acres			*Number of Farms*		
Alabama	10,600	10,600	10,300	48,000	47,000	47,000
Alaska	1,030	1,010	1,000	620	600	580
Arizona	36,500	36,000	36,000	8,100	8,100	7,800
Arkansas	15,800	15,700	15,500	49,000	48,000	47,000
California	31,600	31,300	30,800	84,000	84,000	85,000
Colorado	33,700	33,500	33,100	27,300	27,000	26,500
Connecticut	440	440	420	4,000	4,000	3,900
Delaware	590	590	570	3,000	3,000	2,900
Florida	11,500	11,200	10,900	41,000	41,000	41,000
Georgia	13,000	12,600	12,500	49,000	48,000	49,000
Hawaii	1,720	1,720	1,710	4,650	4,650	4,600
Idaho	13,700	13,700	13,700	22,500	22,100	21,800
Illinois	28,600	28,500	28,500	88,000	86,000	83,000
Indiana	16,400	16,400	16,300	74,000	71,000	68,000
Iowa	33,500	33,500	33,500	107,000	105,000	104,000
Kansas	47,900	47,900	47,900	69,000	69,000	69,000
Kentucky	14,300	14,200	14,100	97,000	95,000	93,000
Louisiana	9,100	9,100	9,000	33,000	34,000	34,000
Maine	1,450	1,450	1,450	7,300	7,300	7,300
Maryland	2,350	2,300	2,250	16,000	15,600	15,200
Massachusetts	680	680	680	6,900	6,900	6,900
Michigan	10,900	10,800	10,800	56,000	55,000	54,000
Minnesota	30,000	30,000	30,000	92,000	90,000	89,000
Mississippi	13,500	13,300	13,000	42,000	41,000	40,000
Missouri	30,500	30,400	30,400	110,000	109,000	108,000
Montana	60,700	60,600	60,500	24,600	24,700	24,700
Nebraska	47,100	47,100	47,100	58,000	57,000	57,000
Nevada	8,900	8,900	8,900	2,600	2,500	2,500
New Hampshire	510	500	490	3,200	3,100	3,000
New Jersey	880	880	870	8,300	8,300	8,100
New Mexico	44,500	44,500	44,500	14,000	14,000	13,500
New York	8,600	8,400	8,400	41,000	39,000	38,500
North Carolina	10,300	10,000	9,700	68,000	65,000	62,000
North Dakota	40,600	40,500	40,500	33,500	33,500	34,000
Ohio	15,600	15,700	15,700	85,000	86,000	84,000
Oklahoma	33,000	33,000	33,000	70,000	70,000	70,000
Oregon	17,800	17,800	17,800	36,500	37,000	36,500
Pennsylvania	8,300	8,200	8,100	55,000	54,000	53,000
Rhode Island	73	73	71	770	770	770
South Carolina	5,300	5,300	5,200	26,000	25,500	24,500
South Dakota	44,300	44,300	44,300	35,000	35,000	35,000
Tennessee	12,600	12,600	12,400	91,000	91,000	89,000
Texas	132,000	132,000	132,000	187,000	186,000	186,000
Utah	11,300	11,300	11,300	13,300	13,000	13,200
Vermont	1,520	1,510	1,510	7,100	7,000	7,000
Virginia	9,100	9,000	8,900	48,000	47,000	46,000
Washington	16,000	16,000	16,000	38,000	38,000	37,000
West Virginia	3,700	3,700	3,700	21,000	21,000	20,500
Wisconsin	17,700	17,600	17,600	82,000	81,000	80,000
Wyoming	34,800	34,800	34,800	8,900	8,900	8,900
United States	994,543	991,153	987,721	197,140	170,520	143,150

[1] A farm is an establishment that as of June 1 sold or would normally have sold $1,000 or more of agricultural products during the year.

[2] Preliminary.

Table 32.—Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, by ownerships and regions, 1952,1962, 1970, 1977, 1987 (1977=100)

Year	Timber Land area (million Acres)	Softwoods						Hardwoods					
		Net annual growth	Annual removals	Total inven-tory	Annual growth per acre (Cu. ft.)	Productivity indexes		Net annual growth	Annual removals	Total inven-tory	Annual growth per acre (Cu. ft.)	Productivity indexes	
		Billion cubic feet				growth/ inventory	removals/ inventory	Billion cubic feet				growth/ inventory	removals/ inventory
United States, all owners and regions													
1952	509	7.7	7.8	430	15.2	67	83	6.2	4.1	180	12.2	95	139
1962	515	9.6	7.6	448	18.7	80	79	7.1	4.3	211	13.8	93	127
1970	504	11.3	9.3	458	22.5	92	94	8.5	4.2	236	16.8	99	111
1977	491	12.5	10.0	465	25.2	100	100	9.3	9.4	260	19.2	100	100
1987	483	12.9	11.4	451	26.6	106	117	9.7	9.7	305	20.0	87	103
Forest Industry													
1952	59	1.9	2.8	77	31.7	61	74	0.7	0.5	20	11.7	90	139
1962	61	2.3	2.3	76	37.9	77	62	0.8	0.7	25	13.5	87	142
1970	68	2.6	3.1	75	38.9	88	85	1.1	0.6	29	15.8	97	106
1977	69	2.9	3.6	74	42.8	100	100	1.2	0.6	32	17.7	100	100
1987	71	3.2	4.2	72	45.5	112	119	1.2	0.8	35	16.4	86	124
Other Private													
1952	297	3.5	3.5	94	11.7	78	131	4.6	3.3	131	15.5	95	139
1962	301	4.3	3.0	103	14.4	88	102	5.1	3.4	149	17.0	93	127
1970	286	5.2	3.3	114	18.3	96	100	6.1	3.3	164	21.3	100	112
1977	278	5.9	3.5	124	21.5	100	100	6.7	3.2	181	24.1	100	100
1987	276	5.5	4.2	135	19.8	85	109	6.9	3.9	214	25.0	87	102
National Forests													
1952	95	1.7	1.0	204	17.6	69	53	0.4	0.1	13	4.2	96	142
1962	97	2.0	1.7	214	20.6	79	85	0.5	0.1	17	5.2	96	121
1970	95	2.4	2.2	212	25.0	94	106	0.6	0.1	19	6.1	98	126
1977	89	2.5	2.0	208	27.8	100	100	0.7	0.1	21	7.4	100	100
1987	85	2.8	2.1	186	33.0	127	116	0.6	0.2	25	7.3	81	107

Table 32.—Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, by ownerships and regions, 1952,1962, 1970, 1977, 1987 (1977=100)—Continued

Year	Timber Land area (million Acres)	Softwoods						Hardwoods					
		Net annual growth	Annual removals	Total inventory	Annual growth per acre (Cu. ft.)	Productivity indexes		Net annual growth	Annual removals	Total inventory	Annual growth per acre (Cu. ft.)	Productivity indexes	
		Billion cubic feet				growth/ inventory	removals/ inventory	Billion cubic feet				growth/ inventory	removals/ inventory
							Other Public						
1952	58	0.7	0.4	55	12.6	66	52	0.5	0.1	16	8.5	94	107
1962	56	1.0	0.6	56	17.2	85	69	0.6	0.2	21	11.4	96	89
1970	56	1.1	0.8	57	20.0	96	89	0.7	0.2	24	13.4	98	99
1977	56	1.2	0.9	59	21.4	100	100	0.8	0.2	26	15.1	100	100
1987	51	1.4	0.9	57	27.0	123	120	105	1.0	0.2	31	97	81
							South						
1952	205	3.6	3.1	59	17.8	97	117	3.0	2.6	84	14.9	84	153
1962	209	4.7	2.8	73	22.5	101	86	3.4	2.7	95	16.3	83	150
1970	203	5.6	3.7	87	27.8	102	95	4.3	2.3	104	21.1	96	119
1977	198	6.3	4.4	99	31.8	100	100	5.0	2.2	116	25.2	100	100
1987	195	5.8	5.7	104	29.9	88	123	4.6	3.0	134	23.4	79	114
							West						
1952	150	3.1	4.0	344	20.8	63	77	0.4	0.0	19	2.6	81	51
1962	150	3.7	4.3	341	24.7	75	82	0.5	0.1	22	3.3	87	63
1970	146	4.4	5.0	332	29.8	91	99	0.6	0.1	25	4.1	94	93
1977	139	4.6	4.9	322	33.2	100	100	0.6	0.1	25	4.5	100	100
1987	133	5.7	4.9	300	43.0	133	108	0.9	0.1	31	6.4	108	76
							North						
1952	154	1.0	0.6	27	6.3	100	148	2.7	1.5	77	17.8	112	126
1962	157	1.2	0.5	34	7.7	101	101	3.2	1.5	95	20.5	107	106
1970	154	1.3	0.6	39	8.7	97	95	3.6	1.7	107	23.3	106	106
1977	153	1.6	0.7	44	10.2	100	100	3.8	1.8	119	24.7	100	100
1987	155	1.3	0.7	47	8.3	76	97	4.2	2.0	140	27.3	95	94

Table 33.—Loan rates, target prices, and deficiency payment rates, under Federal farm programs, 1975-90 crops

Commodity	Unit	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Loan Rates																	
Corn	($/BU.)	1.10	1.50	2.00	2.00	2.10	2.25/2.40[1]	2.40/2.55[1]	2.55/2.90[1]	2.65/2.65[1]	2.55	2.55	1.92	1.82	1.77	1.65	1.57
Sorghum	($/BU.)	1.05	1.43	1.90	1.90	2.00	2.14/2.28[1]	2.28/2.42[1]	2.42/2.75[1]	2.52/2.52[1]	2.42	2.42	1.82	1.74	1.68	1.57	1.49
Barley	($/BU.)	.90	1.22	1.63	1.63	1.71	1.83/1.95[1]	1.95/2.07[1]	2.08/2.37[1]	2.16/2.16[1]	2.08	2.08	1.56	1.49	1.44	1.34	1.28
Oats	($/BU.)	.54	.72	1.03	1.03	1.08	1.16/1.23[1]	1.24/1.31[1]	1.31/1.49[1]	1.36/1.36[1]	1.31	1.31	.99	.94	.90	.85	.81
Rye	($/BU.)	.89	1.20	1.70	1.70	1.70	1.90	2.04	2.17	2.25	2.17	2.17	1.63	1.55	1.50	1.40	1.33
Wheat	($/BU.)	1.37	2.25	2.25	2.35	2.50	3.00/3.30[1]	3.20/3.50[1]	3.55/4.00[1]	3.65/3.65[1]	3.30	3.30	2.40	2.28	2.21	2.05	1.95
Upland Cotton	($/LB.)	.3427	.3712	.4258	.4800	.5023	.4800	.5246	.5708	.5500	.5500	.5730	.5500	.5225	.5180	.5000	.5027
Rice	($/CWT.)	8.52	6.19	6.19	6.40	6.79	7.12	8.01	8.14	8.14	8.00	8.00	7.20	6.84	6.63	6.50	6.50
Soybeans	($/BU.)	.00	2.50	3.50	4.50	4.50	5.02	5.02	5.02	5.02	5.02	5.02	4.77	4.77	4.77	4.53	na
ELS Cotton	($/LB.)	.6774	.7324	.7670	.8320	.9295	.9350	.9900	.9989	.9625	.8250	.8595	.8540	.8140	.8092	.8177	.8177
Flaxseed	($/BU.)	.00	.00	.00	4.50[2]	4.50[2]	4.50[2]	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Honey	($/LB.)	.255	.294	.327	.368	.439	.503	.574	.604	.622	.658	.653	.640	.610	.591	.564	na
Target Prices																	
Corn	($/BU.)	1.38	1.57	2.00	2.10	2.20	2.35/2.05[3]	2.40	2.70	2.86	3.03	3.03	3.03	3.03	2.93	2.84	2.75
Sorghum	($/BU.)	1.31	1.49	2.28	2.28	2.34	2.50/2.45[3]	2.55	2.60	2.72	2.88	2.88	2.88	2.88	2.78	2.70	2.61
Barley	($/BU.)	1.13	1.28	2.15	2.25	2.40	2.55/2.29[3]	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.51	2.43	2.36
Oats	($/BU.)	—[5]	—	—	—	—	—	—	1.50	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.45
Wheat	($/BU.)	2.05	2.29	2.90	3.40	3.40	3.63/3.08[3]	3.81	4.05	4.30	4.38	4.38	4.38	4.38	4.23	4.10	4.00
Upland Cotton	($/LB.)	.3800	.3800	.4320	.4780	.5770	.5840	.7087	.7100	.7600	.8100	.8100	.8100	.7940	.7590	.7340	.7290
ELS Cotton	($/LB.)	—	—	—	—	—	—	—	—	—	.9900	1.0314	1.0248	.9770	.9570	.9670	.9010
Rice	($/CWT.)	—	8.25	8.25	8.53	9.05	9.49	1.68	1.85	11.40	11.90	11.90	11.90	11.66	11.15	1.80	10.71
Deficiency Payment Rates																	
Corn	($/BU.)	.00	.00	.00	.03	.00	.00	.00	.15	.00	.43	.48	1.11[4]	1.09	.36	.58	.90
Sorghum	($/BU.)	.00	.00	.00	.33	.13	.00	.27	.18	.00	.46	.46	1.06[4]	1.14	.48	.66	.91
Barley	($/BU.)	.00	.00	.50	.35	.11	.00	.11	.40	.21	.26	.52	.99[4]	.79	.00	.00	.26
Oats	($/BU.)	.00	.00	.00	.00	.00	.00	.00	.00	.11	.00	.29	.39[4]	.20	.00	.00	.00
Wheat	($/BU.)	.00	.00	.65	.52	.00	.00	.15	.50	.65	1.00	1.08	1.98[4]	1.81	.69	.32	.90
Upland Cotton	($/LB.)	.00	.00	.00	.00	.00	.00	.767	.1392	.1210	.1860	.2370	.2600[4]	.1730	.1940	.1310	.0800
Rice	($/CWT.)	.00	1.70	.00	.78	.00	.00	.28	2.71	2.77	3.76	3.90	4.70[4]	4.82	4.31	3.46	3.91
ELS Cotton	($/LB.)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.1414	.1408	.00	.00	.00	.00

[1] The first entry is the regular loan rate; the second entry is the Farmer-Owned Reserve loan rate. [2] Purchase program only. [3] The first entry is the target price applicable to those producers who planted within the farm Normal Crop Acreage (NCA); the second entry is for those who planted in excess of the farm NCA. [4] Maximum level. [5] "—" = No target price in effect. Source: Agricultural Stabilization and Conservation Service.

APPENDIX II. TABLES ON PROJECTS FOR WATER QUALITY ENHANCEMENT

Table 1. DEMONSTRATION PROJECTS

State	Project Name
Arkansas	Millwood Lake
California	Sacramento Valley
Colorado	San Luis Valley
Florida	Lake Manatee Watershed
Georgia	Gum Creek
Idaho	Snake River Plain
Iowa	Northeast Iowa River
Maryland	Monocacy River Watershed
Michigan	Saginaw Bay
Minnesota	Anoka Sand Plain
Nebraska	Mid-Nebraska
New York	Wallkill-Roundout Watershed
North Carolina	Herrings Marsh Run
South Dakota	Big Sioux Aquifer
Texas	Seco Creek
Wisconsin	East River Watershed

Table 2. NONPOINT SOURCE HYDROLOGIC UNIT AREA PROJECTS

State	Project Name
Alabama	Sand Mountain/Lake Guntersville
	Ryan/Crooked/Rock Creeks
Arizona	Casa Grande/Coolidge
	West Maricopa
Arkansas	Moore's Creek
	Long Creek
California	Westside San Joaquin Valley
	Morro Bay
	West Stanislaus
Colorado	Patterson Hollow
Connecticut	Housatonic River
	Scantic River
Delaware	Inland Bays
Florida	Middle Suwannee River
	Karst Cropland
	Lake Apopka Drainage Basin
Georgia	Little River-Rooty Creek
Hawaii	Kaiaka-Waialua

Table 2. NONPOINT SOURCE HYDROLOGIC UNIT AREA PROJECTS—Continued

State	Project Name
Idaho	Snake-Payette Rivers
Illinois	Illinois River Sands
	Little Vermilion River
Indiana	Upper Tippecanoe
	Upper Kankakee River
Iowa	Union Grove and Black Hawk
	Three Mile Creek
	Magill Creek
Kansas	Webster Creek
Kentucky	Taylorsville Lake/Upper Salt River
Louisiana	Bayou Queue de Tortue
Maine	Long/Cross Lakes
Maryland	German Branch
Massachusetts	Buzzards Bay
	Wachusetts Reservoir
Michigan	Sycamore Creek
	Wolf Creek
Minnesota	St. Peter/Prairie du Chien
Mississippi	Tangipahoa River
Missouri	Upper Niangua
Montana	Godfrey Creek
Nebraska	Elm Creek
	Central Blue Valley
New Hampshire	Great Bay
	Upper Connecticut
New Jersey	Great Swamp
New Mexico	Dona Ana/Sierra
New York	East Sidney Lake
North Carolina	Goshen Swamp
North Dakota	Bowman/Haley
Ohio	Indian Lake
	Darby Creek
Oklahoma	Battle Branch
	Peacheater Creek
Oregon	Ontario
	Tualatin River/Dairy-McKay
Pennsylvania	Pequea-Mill Creeks
Puerto Rico	Lake Loiza
Rhode Island	Pawcatuck
South Carolina	Camping Creek
	Lake Bowen
South Dakota	Richmond Lake
	Lower Rapid Creek
Tennessee	N. Fork Creek-Fall Creek
	Beaver Creek

Table 2. NONPOINT SOURCE HYDROLOGIC UNIT AREA PROJECTS—Continued

State	Project Name
Texas	Upper North Bosque
	Seymour Aquifer
	Lake Fork Creek
Utah	Little Bear River
	Otter Creek/Koosharem
Vermont	Lower Missisquoi
Virginia	Blackwater River
Washington	Granger Drain
West Virginia	Greenbriar River
Wisconsin	Plover/Whiting Wellhead Area
Wyoming	Ocean Lake

Table 3. WATER QUALITY SPECIAL PROJECTS

State	Project Name
Alabama	Big Prairie Creek
Arizona	Silver Creek
Arkansas	Beaver Lake
	Illinois River
California	Livestock Waste Control
Colorado	Holbrook
Delaware	Nanticoke River
	Chesapeake Bay
Georgia	Piedmont
	Upper Chattahoochee River Basin
Hawaii	Maunawili-Waimanalo
Idaho	Lake Lowell and Indian Creek
Illinois	Cedar Lake
Indiana	Lagrange County Lakes
Iowa	Corydon Lake
	French Creek
Kansas	Miola Lake
	Squaw Creek
	Rock Creek
Kentucky	Mammoth Cave Area
Louisiana	Tangipahoa River
	Sabine River-San Miguel
Maine	Kenduskeag Stream
	25 Mile River
	St. George River
Maryland	Bohemia-Sassafras Rivers
	Chincoteague & Sinepuxent Bay
Massachusetts	Lower Deerfield River
	Billington Sea

Table 3. **WATER QUALITY SPECIAL PROJECTS**—Continued

State	Project Name
Michigan	Clam River
	North Lake Leelanau
Minnesota	Sauk River and Chain-of-Lakes
Mississippi	Tenn-Tom
Nebraska	Quad County
	Southern Nuckolls
	Bazile Triangle
New York	Cattaraugus Creek
	Lake Champlain and Empire Basin
	Susquehanna River Basin
North Carolina	Upper Hiawassee
North Dakota	Renwick Watershed
Ohio	Clark Lake
	Upper Darby
	Upper Vermillion
	Old Woman Creek
Oklahoma	Peacheater
Oregon	Coquille River Basin
	Nestucca River
	Crabtree-Thomas Creek
Pennsylvania	Potomac-Juniata
	Lake Wallenpaupack
Rhode Island	Naragansett Bay
South Carolina	Clarendon-Sumter
	Greenwood-McCormick
	Little Saluda/Clouds Creek
South Dakota	Bad River
Tennessee	Lick-Limestone Creeks
	Upper Duck River
	Sweetwater Creek
Utah	Rabbit Valley
Vermont	Lower Lake Champlain
Virginia	Lower Nottaway-Blackwater Rivers
	Rockingham County
	Accomack County
Washington	South Fork Palouse River
	Kamm Creek
West Virginia	Upper Mill Creek
Wisconsin	Lake Neshonoc-Little La Crosse River

4. MANAGEMENT SYSTEMS EVALUATION AREA PROJECTS

State	Project Name
Iowa	Evaluation of the Impact of Current and Emerging Farming Systems on Water Quality
Minnesota	Midwest Initiative on Water Quality: Northern Cornbelt Sand Plains
Missouri	Alternative Management Systems for Enhancing Water Quality of an Aquifer Underlying Claypan Soils
Nebraska	Management of Irrigated Corn and Soybeans to Minimize Ground Water Contamination
Ohio	The Ohio Buried Valley Aquifer Management Systems Evaluation Area

APPENDIX III. METRIC CONVERSION CHART

Measurement	To convert this	To this	Multiply by
LENGTH	inches	millimeters (mm)	25.4
	feet	centimeters (cm)	39.
	yards	meters (m)	.91
	miles	kilometer (km)	1.61
	millimeters	inches	.04
	centimeters	inches	.4
	meter	yards	1.1
	kilometer	miles	.6
WEIGHT	ounces	grams (g)	28.
	pounds	kilograms (kg)	.45
	short tons	metric tons (t)	.9
	kilograms	pounds	2.2
	metric tons	Short ton	1.1
AREA	square inches	square centimeters (cm^2)	6.5
	square feet	square (m^2)	.09
	square miles	square kilometers (m^2)	2.6
	acres	hectares (ha)	.4
	square centimeters	square inches	.16
	square meter	square yards	1.2
	square kilometers	square miles	.4
	hectares	acres	2.5
VOLUME	teaspoons	milliliters (ml)	5.
	tablespoons	milliliters (ml)	1 5.
	fluid ounces	milliliters (ml)	30.
	cups	liter[1]	.24
	pints	liter[1]	.47
	quarts	liter[1]	.95
	gallons	liter[1]	3.8
	cubic feet	cubic meter (m^3)	.03
	cubic yards	cubic meters (m^3)	.76
	milliliters	fluid ounces	.03
	liter	pints	2.1
	liters	quarts	1.06
	liters	gallons	.26
	cubic meters	cubic feet	35.
	cubic meters	cubic yards	1.3

APPENDIX III. METRIC CONVERSION CHART—Continued

TEMPERATURE	Fahrenheit	Celsius (°C)	.56[1]
	Celsius	Fahrenheit	1.82[2]
FARM PRODUCTS	pounds per acre	kilograms per	1.14
	short tons per acre	hectare (kg/ha)	2.25
	kg/ha	metric tons per hectare (t/ha)	.001
	kg/ha	pounds per acre	.88
	t/ha	short tons per acre	.44
	t/ha	kg/ha	1000.

1 BUSHEL OF	
—wheat, soybeans, potatoes	=60 lbs. X .45=27 kg.
—corn, gr. sorg., rye, flaxseed	=56 lbs. X .45=25 kg.
—beets, carrots	=50 lbs. X .45=23 kg.
—barley, buckwheat, peaches	=48 lbs. X .45=22 kg.
—oats, cottonseed	=32 lbs. X .45=14 kg.

1 METRIC TON OF	
—wheat, soybeans, potatoes	=2,204.6 lbs. ÷ 60lbs.=36.74 bu.
—corn, gr. sorg., rye, flaxseed	=2,204.6 lbs. ÷ 56lbs.=39.37 bu.
—beets, carrots	=2,204.6 lbs. ÷ 50lbs.=44.09 bu.
—barley, buckwheat, peaches	=2,204.6 lbs. ÷ 48lbs.=45.93 bu.
—oats, cottonseed	=2,204.6 lbs. ÷ 32lbs.=68.89 bu.

---

[1] After subtracting 31.

[2] Then add 32.

APPENDIX IV. GLOSSARY

Editor's Note: This glossary defines those terms found in this book and not readily found in a common collegiate-type dictionary.

ACRE. A measurement of land area equal to 43,560 square feet—about 209 feet by 209 feet. This is slightly smaller in size than a football field, which is 48,000 square feet—300 feet by 160 feet.

ACREAGE ALLOTMENT. The individual farm's share, based on its previous production of national acreage needed to produce sufficient supplies of a particular crop. Allotments currently apply only to tobacco.

ADJUSTED BASE PERIOD PRICE. Average price received by farmers in most recent 10 years, divided by an index (1910-14=100) of average prices received by farmers for all farm products in same 10 years.

Used in parity calculations.

ALTERNATIVE FARMING SYSTEMS. Many farmers seek alternatives to energy-and chemical-intensive monoculture food and fiber production systems that became the norm after World War II.

Strategies include using animal and green manure, integrated pest management, reduced tillage, crop rotations—especially with legumes—adding alternative crops, or diversifying farm enterprise.

See related terms: LOW-INPUT FARMING and ORGANIC FARMING.

ANIMAL UNIT. A standard measure based on feed requirements used to combine various classes of livestock according to size, weight, age, and use.

ATTAINABLE YIELD. Yields expected through use of known technology.

See YIELD, ECONOMIC MAXIMUM.

AUTOIMMUNITY. A condition in which the body mounts an immune response against one of its own organs or tissues.

BASE PERIOD PRICE. Average price for an item in a specified time period used as a base for an index such as 1910-14, 1957-59, 1967, 1977.

BASIC COMMODITIES. Six agricultural crops (corn, cotton, peanuts, rice, tobacco, and wheat) declared by legislation as requiring price support.

BIOLOGICAL CONTROL OF PESTS. Control, but not total eradication, of some weeds and insect pests can be achieved by employing natural enemies, either indigenous or imported, or diseases to which the pest is susceptible. It includes such nontoxic pesticides as *Bacillus thuringiensis (Bt)*.

BIOTECHNOLOGY. No official government definition has been agreed upon, but one widely accepted definition is: Use of micro-organisms, plant cells, animal cells, or parts of cells, such as enzymes, to produce products or carry out processes. (Also see GENETIC ENGINEERING.)

BREEDING UNIT INDEX. A measure of a breeding herd, including total number of female animals capable of giving birth, weighted by production per head, in a base period.

Bt. A protein produced by the *Bacillus thuringiensis (Bt)* microbe. When ingested by certain caterpillars, it becomes toxic and kills them. *Bt* is routinely sprayed around homes or commercial areas to control insect pests.

CARRYOVER. Volume of a farm commodity not yet used at end of a marketing year. It is remaining stock carried over into the next year. Marketing years generally start at beginning of new harvest for a commodity and extend to same time in following year.

CASH GRAIN FARM. A farm on which corn, grain sorghum, small grains, soybeans, or field beans and peas account for at least 50 percent of value of products sold.

CELL CULTURE. Growth of cells under laboratory conditions.

CENSUS OF AGRICULTURE. A count taken by U.S. Bureau of the Census every 5 years of number of farms, land in farms, crop acreage and production, livestock numbers and production, farm spending, farm facilities and equipment, farm tenure, value of farm products sold, farm size, type of farm, etc. Data are obtained for States and counties.

COMPLEMENTARY IMPORTS. Agricultural import items not produced in appreciable commercial volume in the United States. Examples: Bananas, coffee, rubber, cocoa, tea, spices, and cordage fiber.(See SUPPLEMENTARY IMPORTS.)

CONSERVATION TILLAGE. Any of several farming methods that provide for seed germination, plant growth, and weed control yet maintain effective ground cover throughout the year and disturb the soil as little as possible. The aim is to reduce soil loss and energy use while maintaining crop yields and quality.

CONTOUR FARMING. Field operations such as plowing, planting, cultivating, and harvesting on the contour, or at right angles to the natural slope, to reduce soil erosion, protect soil fertility, and use water more efficiently.

COOPERATIVE EXTENSION SERVICE. Educational work for people outside of classrooms carried on by Cooperative Extension System: States, usually through the resources of the land-grant colleges and universities, in cooperation with the USDA Extension Service staff, who represent the Department in conducting cooperative Extension work.

CORN-HOG RATIO. Number of bushels of corn that are equal (in value) to 100 pounds of live hogs; that is, the price of hogs per hundredweight divided by the price of corn per bushel. Can be calculated in terms of U.S. average prices received by farmers or prices received by farmers in a given area or on the basis of central market prices rather than farm prices. This ratio has exhibited both seasonal and cyclical movements.

CORPORATION FARM. A farm that is legally incorporated; can be of any size, including family farms.

COST OF PRODUCTION. The average amount in dollars per unit used in growing or raising a farm product, including all purchased inputs and sometimes including allowances for management and the use of owned land. May be expressed on a unit, a per-acre, or a per-bushel basis for all farms in an area or in the whole country.

COUNTY EXTENSION AGENT. A professional worker, jointly employed by the county, State Cooperative Extension Service, and the U.S. Department of Agriculture, to bring agricultural and homemaking information to local people and to help them meet farm, home, and community problems. Also called extension agent, farm and home adviser, agricultural agent, extension home economist, and 4-H or youth agent. (See COOPERATIVE EXTENSION SERVICE.)

CROSS-COMPLIANCE. A Government farm program term meaning that if a farmer wishes to participate in a program for one crop by meeting the qualifications for production adjustment payments and loans for that crop, the farmer must also meet the program provisions for other major program crops that the farmer grows.

CUSTOM WORK. Specific farm operations performed under contract between the farmer and the contractor. The contractor furnishes labor, equipment, and materials to perform the operation. Custom harvesting of grain, spraying and picking of fruit, and sheep shearing are examples.

DEFICIENCY PAYMENTS. Funds paid to farmers when farm prices are below the target price arrived at by subtracting from the target price the higher of (1) the loan rate, or (2) the national average market price of a commodity during specified portions of the marketing year. Generally, the Federal Government pays this difference to a farmer who qualifies (by meeting all farm program conditions) for that portion of the farmer's production specified in the farm program.

DISASTER PAYMENTS. Federal aid provided to farmers for feed grains, wheat, rice, and upland cotton when either (1) planting is prevented or (2) crop yields are abnormally low because of adverse weather and related conditions.

DNA. Deoxyribonucleic acid, a compound of deoxyribose (a sugar), phosphoric acid, and four nitrogen bases: Adenine, cytosine, guanine, and thymine. Its molecule contains the genetic information for most living systems and consists of two strands in the shape of a double helix. A gene is a piece of DNA.

DRYLAND FARMING. A system of producing crops in semiarid regions usually with less than 20 inches of annual rainfall without the use of irrigation. Frequently, part of the land will lie fallow in alternate years to conserve moisture.

EROSION. The loosening and movement of the solid material of the land surface by wind, moving water, ice, and landslides.

ETHANOL. An alcohol fuel that may be produced from an agricultural foodstock such as corn, sugarcane, or wood, and may be blended with gasoline to enhance octane, reduce automotive exhaust pollution, and reduce reliance on petroleum-based fuels.

FAMILY FARM. A farm where the operator and the operator's family make most of the day-to-day management decisions and supply the equity capital and a significant part of the labor needs.

FARM. Any place that has $1,000 or more gross sales of farm products in the course of a year.

FEDERAL LAND BANK ASSOCIATIONS. Local farmer-owned organizations through which farmers obtain long-term (up to 40 years) loans on land. The associations are an integral part of the Farm Credit System, a lending group that supplies nearly one-third of the borrowed capital used by farmers and nearly two-thirds of the credit used by farmer cooperatives. The system's lending institutions include Federal land banks for loans on land, production credit associations for short-term and intermediate operating loans, and the banks for loans to cooperatives.

FEED GRAIN. Any of several grains commonly used for livestock or poultry feed, such as corn, sorghum, oats, and barley.

FOOD GRAIN. Cereal seeds most commonly used for human food, chiefly wheat and rice.

FORWARD CONTRACTING. A method of selling crops before harvest by which the buyer agrees to pay a specified price to a grower for a portion, or all, of his or her crops.

FUTURES CONTRACT. An agreement between two people, one who sells and agrees to deliver and one who buys and agrees to receive a certain kind, quality, and quantity of product to be delivered during a specified delivery month at a specified price.

GENETIC ENGINEERING. The definition in the Federal Register of June 26, 1986, on page 23,370, dealing with agriculture, follows: Genetic modification of organisms by recombinant DNA, recombinant RNA, or other specific molecular gene transfer or exchange techniques.

GREAT PLAINS. A level-to-gently-sloping region of United States that lies between the Rockies and approximately the 98th meridian, stretching from Canada to Mexico. The area is subject to recurring droughts and high winds. It consists of parts of Dakotas, Montana, Nebraska, Wyoming, Kansas, Colorado, Oklahoma, Texas, and New Mexico.

HOG-CORN PRICE RATIO. See CORN-HOG RATIO.

INCOME SUPPORT PAYMENT. See DEFICIENCY PAYMENTS.

INTEGRATED PEST MANAGEMENT. Uses an array of crop production strategies, combined with careful monitoring of insect pests or weed populations and other factors to achieve pest management. Some approaches used are selection of resistant varieties, timing of cultivation, biological control methods, and minimal use of chemical pesticides so that natural enemies of pests are not destroyed. (See BIOLOGICAL CONTROL OF PESTS.)

INTERNATIONAL TRADE BARRIERS. Regulations used by governments to restrict imports from other countries. Examples: Tariffs, embargoes, import quotas, and unnecessary sanitary restrictions.

LAND CAPABILITY. A measure of suitability of land for use without damage. In the United States, it usually expresses the effect of physical land conditions, including climate, on total suitability for agricultural use without damage. Arable soils are grouped according to their limitations for sustained production of common cultivated crops without soil deterioration. Nonarable soils are grouped according to their limitations for production of permanent vegetation and their risks of soil damage if mismanaged.

LAND-GRANT INSTITUTIONS. State colleges and universities started from Federal Government grants of land to each State to encourage further practical education in agriculture, homemaking, and mechanical arts.

LAND-USE PLANNING. Decisionmaking process to determine present and future uses of land. The resulting plan is the key element of a comprehensive plan describing recommended location and intensity of development for public and private land uses such as residential, commercial, industrial, recreational, and agricultural.

Implementing the plan is the applied phase.

LINTERS. Short fibers remaining on cottonseed after ginning. Too short for usual textile use, they are used for batting and mattress stuffing and as source of cellulose.

LOAN RATE. Price per unit (bushel, bale, pound) at which the Government will provide loans to farmers to enable them to hold their crops for later sale.

LOW-INPUT SUSTAINABLE AGRICULTURE (LISA). A term that most experts maintain means using, to the greatest extent possible, resources obtainable from a farm itself for farming it; others sometimes say LISA includes organic farming. (Also see ORGANIC FARMING and ALTERNATIVE FARMING SYSTEMS.)

MARKET BASKET OF FARM FOODS. Average quantities of U.S. farm foods purchased annually per household in a given period. Retail cost of these foods used as a basis for computing an index of retail prices for domestically produced farm foods. Excluded are fishery products, imported foods, and meals eaten away from home.

MARKETING ORDERS AND AGREEMENTS (FEDERAL). A means (authorized by, and based on, legislation) to permit agricultural producers to collectively influence supply, demand, and/or price for a particular crop or commodity in order to improve orderly marketing of crop or commodity. Once approved by a required number, usually two-thirds, of producers of regulated commodity, the marketing order is binding on all handlers of commodity in the area of regulation. A marketing agreement may contain more diversified provisions, but it is enforceable with respect to those producers or handlers who voluntarily enter into agreement with the Secretary of Agriculture.

MARKETING QUOTA. That quantity of a crop that will provide adequate and normal market supplies. This quantity is translated into terms of acreage needed to grow that amount and allotted among individual farms based on their previous production of that commodity. When marketing quotas are in effect (only after approval by two-thirds or more of eligible producers voting in a referendum), growers who produce in excess of their farm acreage allotments are subject to marketing penalties on “excess” production and are ineligible for Government price-support loans. For certain tobaccos, a poundage limitation is applicable as well as acreage allotments when approved by grower referendum.

MARKETING SPREAD. Difference between the retail price of a product and farm value of the ingredients in the product. This farm-retail spread includes charges made by marketing firms for assembling, storing, processing, transporting, and distributing products.

MARKETING YEAR. Year beginning at harvest time during which a crop moves to market. See CARRYOVER.

METROPOLITAN STATISTICAL AREA (MSA). A county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or twin cities with a combined population of at least 50,000. In addition, contiguous counties are included in an MSA if, according to certain criteria, they are socially and economically integrated with a central city.

NATIONAL PROGRAM ACREAGE (NPA). Number of harvested acres of feed grains, wheat, cotton, and rice needed nationally to meet domestic and export use and to accomplish a desired increase or decrease in carryover levels. Program acreage for an individual farm is based on a producer's share of national farm program acreage, except when an acreage reduction program has been announced.

NATIONAL FOREST. A Federal reservation dedicated to protection and management of natural resources, under concept of multiple use, for a variety of benefits including water, forage, wildlife habitat, wood, recreation, and minerals. National forests are administered by USDA's Forest Service, while national parks are administered by the Interior Department's National Park Service.

NATIONAL GRASSLAND. Land, mainly grass and shrub cover, administered by the Forest Service as part of the National Forest System for promotion of grassland agriculture, watersheds, grazing, wildlife, and recreation.

NATIONAL WOOL ACT. Legislation that provides price support for shorn wool at an incentive level to encourage production. The law also provides for payment on sales of unshorn lambs and for mohair (hair from Angora goats).

NET FARM INCOME. The money and nonmoney income farm operations realize from farming as a return to owner-operators, partners, tenant-operators, shareholders in farming corporations, and contractors for labor, investment, and management after production expenses (including salaries of hired managers) have been paid.

Farm income is measured in two ways: Net farm income before inventory adjustment and net farm income after inventory adjustment. Net farm income before inventory adjustment does not include changes in the value of inventories such as crops and livestock at end of year.

NITROGEN. A chemical element essential to life and one of the primary plant nutrients. Animals get nitrogen from protein feeds, plants get it from soil, and some bacteria get it directly from air.

NONFARM INCOME. Includes all income from nonfarm sources (excludes money earned from working for other farmers) received by owner-operator families residing on a farm and by hired farm labor residing on a farm.

NONMONEY FARM INCOME. A statistical allowance used in farm income compilations to credit farmers with income for the value of farm products used on the farm (instead of being sold for cash) and the rental value of farm dwellings. It assumes farmers otherwise live rent-free on their farm business premises.

NONRECOURSE LOANS. Price-support loans to farmers to enable them to hold their crops for later sale. Farmers may redeem their loans by paying them off with interest. The loans are nonrecourse because if a farmer cannot profitably sell the commodity and repay the loan when it matures, the pledged or mortgaged collateral (the commodity on which the loan was advanced) can be delivered to the Government for settlement of the loan.

NORMAL CROP ACREAGE (NCA). The normal acreage on a farm devoted to a group of crops designated by the Secretary of Agriculture. When in effect, a farm's total planted acreage of such designated crops plus any set-aside cannot exceed the normal crop acreage if a farmer wants to participate in the program(s).

NORMAL YIELD. A term designating the average historic yield established for a particular farm or area. Can also describe average yields. Normal production would be the normal acreage planted to a commodity multiplied by the normal yield.

OFF-FARM INCOME. Off-farm income includes wages and salaries from working for other farmers, plus nonfarm income, for all owner-operator families, regardless of where they live.

OILSEED CROPS. Primarily soybeans, peanuts, cottonseed, sunflower seeds, and flaxseed used for the production of edible and/or inedible oils, as well as high-protein meals. Lesser oil crops are rapeseed, safflower, castor beans, and sesame.

OILSEED MEAL. The product obtained by grinding the cakes, chips, or flakes that remain after most of the oil is removed from oilseeds.

Oilseed meals are mainly used as a feedstuff for livestock and poultry. They are also used as a raw material in processing edible vegetable-protein products.

ORGANIC FARMING. The USDA Study Team on Organic Farming in July 1980, in "Report and Recommendations on Organic Farming," said there is no universally accepted definition, but added: "Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotation, crop residues, animal manures, legumes, green manure, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and pests."

PARITY PRICE. A commodity price which expresses 1910-14 purchasing power of a commodity, based on its 10-year average price, Parity Index, and a 10-year average of Prices Received Index. Parity price for any commodity equals its 10-year average price multiplied by the ratio of current Parity Index to 10-year average of Prices Received Index. The Parity Index reflects prices paid by farmers for items of production and family living, including interest, taxes, and wage rates. Both Parity Index and Prices Received Index are expressed on a base of 1910-14 = 100. The near threefold gains in farm productivity are not reflected in parity prices. The definition enacted in 1948 permits calculation of parity prices for commodities (like soybeans) that were not widely grown in the 1910-14 base period for parity.

PARITY RATIO. A measure of relative purchasing power of farm products. The ratio between index of prices received by farmers for all farm products and index of prices paid by farmers for commodities and services used in farm production and family living.

The parity ratio measures price relationships (prices received and prices paid). It does not measure farm income or farmers' total purchasing power, because individual farms are larger, and total farm production is higher. It does not measure farmers' welfare to reflect off-farm income, Government payments, farmers' assets, and other factors.

PAYMENT LIMITATIONS. Limitations set by law on the amount of money any one person may receive in farm program payments each year under the feed grain, wheat, cotton, rice, and other farm programs.

PRICE INDEX. An indicator of average price change for a group of commodities that compares prices for those same commodities in some other period, commonly called the base period. Monthly price indexes computed by USDA are Index of Prices Received by Farmers and Index of Prices Paid by Farmers for Commodities and Services, Interest, Taxes, and Farm Wage Rates, called the Parity Index.

PRICE SUPPORT LEVEL. The price for a unit of a farm commodity (bushel, pound) that the Government will support through price-support loans, purchases, and/or payments. Price support levels are determined by law and are set by the Secretary of Agriculture.

PRICES-PAID INDEX. See PARITY PRICE.

PRICES-RECEIVED INDEX. A measure computed on the basis of prices farmers received, usually at the farm or in small local markets.

PRODUCTION CREDIT ASSOCIATIONS. Lending groups, owned by their farmer-borrowers, that provide short-and intermediate-term loans for up to 10 years from funds obtained from investors in money markets. These associations are an integral part of the Farm Credit System.

PRODUCTION EXPENSES. Total cash outlays for production. Capital expenses are figured on annual depreciation rather than on yearly cash outlays for capital items.

PRODUCTIVE CAPACITY. The amount that could be produced within the next season if all the resources currently available were fully employed using the best available technology. Productive capacity will increase whenever the available resources increase or the production of those resources increases. The term describes the possibilities at one point in time but is not fixed for all time.

As real prices and profitability rise, the resources committed to agriculture and the adoption of new technology also rise.

PRODUCTIVITY. The relationship between the quantity of inputs (land, labor, tractors, feed, etc.) employed and the quantity of outputs produced. An increase in productivity means that more outputs can be produced from the same inputs or that the same outputs are produced with fewer inputs. Both single-factor and multifactor indexes are used to measure productivity. Single-factor productivity indexes measure the output per unit of one input at the same time other inputs may be changing. Multifactor productivity indexes consider all productive resources as a whole, netting out the effects of substitution among inputs. Crop yield per acre, output per workhour, and livestock production per breeding animal are all single-factor productivity indicators. The Total Farm Output per Unit of Input Index is a multifactor measure.

PUBLIC LAW 480. A law passed by the Congress in 1954, often referred to as "P.L. 480" or the "Food for Peace" program. Primary purposes are to expand foreign markets for U.S. agricultural products and to use U.S. agricultural abundance to combat hunger and encourage economic development in the developing countries. The program makes U.S. agricultural commodities available at low-interest, long-term credit under title I of the law, and as donations for famine or other emergency relief under title II.

Under title I, the recipient country agrees to undertake agricultural development projects to improve its own food production or distribution.

RENEWABLE NATURAL RESOURCES. Resources such as forests, rangeland, soil, and water that can be restored and improved to produce food, fiber, and other things humans need on a sustained basis.

RIBONUCLEIC ACID (RNA). A molecule similar to DNA that functions primarily to decode instructions for protein synthesis that are carried by genes.

ROTATION, CROP. The growing of different crops in recurring succession on the same land.

SECTION 32. A section of Public Law 320 (approved August 24, 1935) that authorizes the use of customs receipts funds to encourage increased consumption of agricultural commodities by means of purchase, export, and diversion programs.

SET-ASIDE. The acreage a farmer must devote to soil-conserving uses (such as grasses, legumes, and small grain that is not allowed to mature) in order to be eligible for production adjustment payments and price-support loans and purchases.

STUBBLE MULCH. A protective cover provided by leaving plant residues of any previous crop as a mulch on the soil surface when preparing for the following crop.

SUBSISTENCE FARM. A low-income farm where the emphasis is on production for use of the operator and the operator's family rather than for sale.

SUPPLEMENTARY IMPORTS. Farm products shipped into this country that add to the output of U.S. agriculture. Examples: Cattle, meat, fruit, vegetables, and tobacco. (See COMPLEMENTARY IMPORTS.)

TARGET PRICES. A minimum level of prices determined by law to provide an economic safety net. Sometimes called the guaranteed price level. The target price, based on costs of production, becomes the level at which the Government will bolster farm income by making payments to qualifying farmers when national average market prices fall below the target. (See DEFICIENCY PAYMENTS.)

TISSUE CULTURE. The technique of growing a whole plant from a single engineered cell or piece of plant tissue.

UNIT COST. The average cost to produce a single item. The total cost divided by the number of items produced.

UPLAND COTTON. A fiber plant developed in the United States from stock native to Mexico and Central America. Includes all cotton grown in the continental United States except Sea Island and American Pima cotton. Staple length of upland cotton ranges from 3/4 inch to 1-1/4 inches.

VECTOR. The messenger that carries new genes into cells. Plasmids are currently the preferred vectors, but viruses may also be used as vectors. Vectors, like yellow-fever mosquitos, may carry diseases.

WATERSHED. The total land area, regardless of size, above a given point on a waterway that contributes runoff water to the flow at that point. A major subdivision of a drainage basin. On the basis of this concept, the United States is generally divided into 18 major drainage areas and 160 principal river drainage basins containing some 12,700 smaller watersheds.

WHOLESALE PRICE INDEX. Measure of average changes in prices of commodities sold in primary U.S. markets. "Wholesale" refers to sales in large quantities by producers, not to prices received by wholesalers, jobbers, or distributors. In agriculture, it is the average price received by farmers for their farm commodities at the first point of sale when the commodity leaves the farm.

YIELD, ECONOMIC MAXIMUM. The most that can be produced on full efficient application of technology presently known by all farmers. Assumes there are no limitations on management, materials, equipment, capital, and experience.

APPENDIX V. SELECTED REFERENCES

Order the following reports from the sources listed under each reference heading. For those specified to be available from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402, make payment by money order or check; GPO also accepts VISA and MasterCard credit cards on mail orders and at all of its bookstores, and on phone orders placed by dialing (202) 783-3238. Currency is sent at sender's risk. Foreign currency and postage stamps are not acceptable. Remittances from foreign countries should be made by international money order or a draft on a U.S. or Canadian bank, payable to Superintendent of Documents. UNESCO coupons are also acceptable from foreign countries.

• • •

AGRICULTURAL STATISTICS BOARD REPORTS

The Agricultural Statistics Board of USDA's National Agricultural Statistics Service (NASS) estimates production, stocks, inventories, disposition, utilization, and prices of agricultural commodities. Publications issued by the Agricultural Statistics Board and its 45 State Statistical Offices are for sale. Information about ordering publications is available from ERS-NASS, P.O. Box 1608, Rockville, MD 20849-1608; phone toll free 1-800-999-6779 (8:30-5:00 Eastern Time).

• • •

RESEARCH REPORTS

All periodicals from the Economic Research Service (ERS) are available on a paid subscription basis. Multiyear subscriptions are available at a discount. For an order form or additional details, contact: ERS-NASS, P.O. Box 1608, Rockville, MD 20850, or phone toll free 1-800-999-6779 (8:30-5:00 ET). Make checks or money orders payable to ERS-NASS. VISA and MasterCard are accepted. Add 25 percent for shipments to foreign addresses.

AGRICULTURAL OUTLOOK, published 11 times a year, pools USDA's latest analyses of commodity supplies and demand, world agricultural trade, food marketing, farm inputs, agricultural policy, transportation and storage, and related developments, and provides USDA's official estimates of farm income and food prices. Special articles range from international trade polices to U.S. land use and availability. The publication is usually about 50 pages long, including 6 pages of charts and 20 pages of statistical tables. Subscription price is $26 for 1 year, $51 for 2 years, and $75 for 3 years.

FARMLINE, with 11 issues annually, reports on ERS research and analysis, with emphasis on how current agricultural economic developments affect U.S. farmers, business people, and consumers. Directed at a general audience, FARMLINE illuminates data and complex trends with striking charts that drive home key points. Subscription price is $12 for 1 year, $23 for 2 years, and $33 for 3 years.

NATIONAL FOOD REVIEW, published quarterly, covers developments, issues, and programs relating to food economics. Objective, in-depth articles detailing the latest ERS information are prepared for economists, nutritionists, educators, consumer advisors, food industry representatives, and others who need to keep posted on current developments in food economics. Subscription price is $11 for 1 year, $21 for 2 years, and $30 for 3 years.

ECONOMIC INDICATORS OF THE FARM SECTOR, series contains five reports that explore the economic status of U.S. farms and farm operator income and expenses. Single copy prices: (1) National Financial Summary ($4 domestic and $5 foreign) and (2) State Financial Summary ($12 domestic and $15 foreign) summarize farming's financial status. (3) Production and Efficiency Statistics ($4 domestic and $5 foreign) is keyed to changes in production, management, and labor practices. (4) Costs of Production: Major Field Crops and (5) Costs of Production: Livestock and Dairy (each $7.50 domestic and $8.38 foreign) gives final average cost estimates for major agricultural commodities. Subscription price for all is $14 domestic ($17.50 foreign) for 1 year, $27 for 2 years, and $39 for 3 years.

RURAL DEVELOPMENT PERSPECTIVES, published three times a year (October, February, and June), bridges the gap between rural theory and practice. It presents the latest research results and ideas in a crisp, nontechnical manner so practitioners can put them to work. Each issue contains 8 to 10 articles (mostly no more than 4 pages long), liberally illustrated with charts and photos, 40-48 pages per issue. Subscription price is $9 for 1 year, $17 for 2 years, and $24 for 3 years.

RURAL CONDITIONS AND TRENDS, published four times a year, discusses the latest data on rural America. It tracks rural events on a variety of subjects: macroeconomic conditions, employment and underemployment, industrial structure, earnings and income, poverty, and population. Subscription price is $14, 1 year; $27, 2 years; $39, 3 years.

FOREIGN AGRICULTURAL TRADE OF THE UNITED STATES, is a bimonthly statistical report on farm exports and imports. Each issue of about 124 pages contains short feature articles that highlight current developments in farm trade, international prices, food aid, and similar topics. Subscribers also receive two annual supplements containing trade data for the fiscal and calendar year. Subscription price is $25 for 1 year, $49 for 2 years, and $72 for 3 years.

THE JOURNAL OF AGRICULTURAL ECONOMICS RESEARCH, a quarterly containing technical articles on agricultural economics, including econometric models and statistics, focusing on methods employed and results of USDA economic research. Each issue carries book reviews. Subscription price is $8 for 1 year, $15 for 2 years, and $21 for 3 years.

SITUATION AND OUTLOOK, reports analyze supply, demand, use, trade, and prices of major crops, livestock, and dairy and poultry products in text, tables, and charts. Reports average 40 pages per issue.

Title	Subscription Price Domestic
Agricultural Exports (4 issues)	$12
Agricultural Resources (5)	$12
Cotton & Wool (4)	$12
Dairy (5)	$12
Feed (4)	$12
Fruit (4)	$12
Livestock & Poultry (8)	$17
Oil Crops (4)	$12
Rice (3)	$12
Sugar & Sweetener (4)	$12
Tobacco (4)	$12
Vegetable (3)	$12
Wheat (4)	$12
World Agriculture (4)	$12

(Foreign addresses add 25 percent.)

Other reports available:

The quarterly REPORTS catalogue provides descriptions and prices of all current ERS publications, including monographs. To be placed on the free mailing list, write to EMS Information, Room 237-USDA, 1301 New York Ave. NW, Washington, DC 20005-4788.

• • •

WEEKLY WEATHER AND CROP BULLETIN, published weekly by USDA and the U.S. Department of Commerce. Summarizes weather and its effects on crops for the preceding week. Condensed summaries give both weather and farm progress for all States. Subscription price is $35 domestic per year and $50 foreign. Make check payable to Department of Commerce, NOAA. Order Weekly Weather and Crop Bulletin, Room 5844 South Building, Washington, DC 20250.

• • •

HUMAN NUTRITION INFORMATION SERVICE

The following reports on food composition and food consumption are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

COMPOSITION OF FOODS...Raw, Processed, Prepared, Agriculture Handbook No. 8 sections are: DAIRY AND EGG PRODUCTS (AH 8-1) $9; SPICES AND HERBS (AH 8-2) $3.75; BABY FOODS (AH 8-3) $12; FATS AND OILS (AH 8-4) $7.50; POULTRY PRODUCTS (AH 8-5) $17;

SOUPS, SAUCES, AND GRAVIES (AH 8-6) $12; SAUSAGES AND LUNCHEON MEATS (AH 8-7) $6; BREAKFAST CEREALS (AH 8-8) $9; FRUITS AND FRUIT JUICES (AH 8-9) $14; PORK PRODUCTS (AH 8-10) $11; VEGETABLES AND VEGETABLE PRODUCTS (AH 8-11) $26; NUT AND SEED PRODUCTS (AH 8-12) $7.50; BEEF PRODUCTS (AH 8-13) $19; BEVERAGES (AH 8-14) $9.50; FINFISH AND SHELLFISH PRODUCTS (AH 8-15) $10; LEGUMES AND LEGUME PRODUCTS (AH 8-16) $8.50; LAMB, VEAL, AND GAME PRODUCTS (AH 8-17) $13; CEREAL GRAINS AND PASTA (AH 8-20) $8.50; FAST FOODS (AH 8-21) $11.

The 1989 SUPPLEMENT to AH 8 sections provides data for new food items and updated data for food items previously published; it costs $11.

USDA METHODOLOGICAL RESEARCH FOR LARGE-SCALE DIETARY INTAKE SURVEYS, 1975-88 (HERR 49) summarizes the substantial body of methodological research sponsored by USDA to improve its procedures for the study of dietary intakes by individuals. These studies were conducted by investigators in universities and private research firms; it costs $20.

NUTRITION MONITORING IN THE UNITED STATES—AN UPDATE REPORT ON NUTRITION MONITORING (published cooperatively by USDA and the U.S. Department of Health and Human Services) presents information on the dietary and nutritional status of the U.S. population; it costs $21.

NUTRITION MONITORING IN THE UNITED STATES—THE DIRECTORY OF FEDERAL NUTRITION MONITORING ACTIVITIES (published cooperatively by USDA and the U.S. Department of Health and Human Services) provides a descriptive summary of current nutrition monitoring activities sponsored by the Federal agencies; it costs $4.

• • •

The following nutrition publications have been developed for the general public and are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402:

DIETARY GUIDELINES AND YOUR DIET (HG 232-1-7) is a set of seven bulletins that show how to apply the Dietary Guidelines to everyday diets; the set costs $4.50.

The following four bulletins give practical help on applying the Dietary Guidelines for Americans day in and day out:

PREPARING FOODS AND PLANNING MENUS USING THE DIETARY GUIDELINES (HG 232-8, $2.50)

MAKING BAG LUNCHES, SNACKS, AND DESSERTS USING THE DIETARy GUIDELINES (HG 232-9, $2.50)

SHOPPING FOR FOOD AND MAKING MEALS IN MINUTES USING THE DIETARY GUIDELINES (HG 232-10, $3)

EATING BETTER WHEN EATING OUT USING THE DIETARY GUIDELINES (HG 232-11, $1.50)

• • •

DIETARY GUIDELINES POSTER (MP 1466) combines a colorful photo of the variety of foods in the diet with a listing of the Dietary Guidelines for Americans. Reproducible masters on reverse provide tips and activities; it costs $3.75.

GOOD SOURCES OF NUTRIENTS, is a set of 17 factsheets on food sources of vitamins, minerals, and dietary fiber; it costs $5.

CALORIES AND WEIGHT: THE USDA POCKET GUIDE (AIB 364) provides consumers with calorie contents of a wide variety of foods in an easy-to-read format and includes helpful information to use when following a weight-loss diet; it costs $1.75.

COOKING FOR PEOPLE WITH FOOD ALLERGIES (HG 246) gives advice and recipes for people who need help managing food allergies or intolerances; it costs $1.50.

THRIFTY MEALS FOR TWO: MAKING FOOD DOLLARS COUNT (HG 244) gives advice on purchasing, planning, and preparing meals for the two-person household; cost is $2.50.

YOUR MONEY'S WORTH IN FOODS (HG 83) shows how to buy food economically; it costs $2.25.

NUTRITIVE VALUE OF FOODS (HG 72) provides values for 18 nutrients in commonly used household measures of more than 900 foods; it costs $2.75.

• • •

OTHER FOOD REPORTS

FOOD AND NUTRITION, published quarterly by the Food and Nutrition Service (FNS), reports on the Federal food assistance programs administered by FNS in cooperation with State and local agencies. The programs include the Food Stamp Program; the Food Distribution Program; the National School Lunch Program and School Breakfast Program; the Child Care Food Program; the Summer Food Service Program for Children; the Special Supplemental Food Program for Women, Infants, and Children; and the Commodity Supplemental Food Program. Free distribution is limited. However, subscriptions can be purchased from the U.S. Government Printing Office. Yearly subscriptions are $5, domestic; $6.25, foreign. Single copies are $1.25, domestic; $1.56, foreign. Send check or money order to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FOOD NEWS FOR CONSUMERS, is published quarterly by the Food Safety and Inspection Service (FSIS), and is available by subscription only: $5, domestic; $6.25, foreign. Order from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

NONPUBLISHED FOOD REPORT

USDA'S TOLL-FREE MEAT AND POULTRY HOTLINE, 1-800-535-4555 (locally, 202-535-4555). Consumers with questions on the safe handling, preparation, and storage of meat and poultry products are encouraged to contact USDA's Tollfree Meat and Poultry Hotline.

Staffed by specially trained home economists, the Hotline is in operation from 10 a.m. to 4 p.m., Eastern Standard Time.

• • •

OTHER REPORTS

SOIL AND WATER CONSERVATION NEWS is published bimonthly by the Soil Conservation Service (SCS). It presents articles in nontechnical language about national, State, and local programs for conserving and developing land and water resources and improving environmental quality. Domestic annual subscription, $6; $7.50, foreign. Send subscription orders to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Free distribution is limited to cooperators of the Department engaged in conservation activities, agricultural colleges and libraries, experiment stations, and similar institutions. Write to SCS, USDA, P.O. Box 2890, Washington, DC 20013-2890.

• • •

FOREIGN AGRICULTURAL TRADE REPORTS

The Foreign Agricultural Service (FAS) issues hundreds of reports every year, based on information from agricultural counselors, attaches, and trade officers stationed around the world. For a complete publications list contact the Information Division, Room 5920-S, Foreign Agricultural Service, U.S. Department of Agriculture, Washington, DC, 20250-1000.

Foreign Agricultural Service (FAS) COMMODITY CIRCULARS are periodic reports on world production and trade of major commodities, including grain and feed, cotton, oilseeds and products, livestock and meat, dairy and poultry, horticultural products, seeds, coffee, sugar, tea, tobacco, and wood products. Send requests for a publications order blank and price list to the Information Division, Room 5920-S, Foreign Agricultural Service, U.S. Department of Agriculture, Washington, DC, 20250-1000.

AGEXPORTER is a monthly magazine for business firms selling U.S. farm products overseas. It includes current and background information useful to export marketing including programs to expand U.S. agricultural exports. Yearly subscription prices are $14 domestic, and $17 foreign. Send a check for the total amount payable to the Foreign Agricultural Service. Only checks on U.S. banks, cashier's checks, or money orders will be accepted. Mail to: Foreign Agricultural Service, Room 4638-S, U.S. Department of Agriculture, Washington, DC, 20250-1000.

DICTIONARY OF INTERNATIONAL AGRICULTURAL TRADE (AH No. 411) includes brief descriptions of a wide variety of subject areas, including agricultural commodities, policy, finance, documentation, transportation, and storage. Copies of this report are available from the Foreign Agricultural Service, Room 5920-S, Information Division, U.S. Department Agriculture, Washington, DC, 20250-1000.

FOREIGN AGRICULTURE, published annually, presents agricultural profiles of 65 countries, focusing on production, marketing, and trade. This 162-page fact book includes a full-color "Atlas of World Agriculture," with maps and graphics. Foreign Agriculture is published annually, $12 domestic and $15 foreign. Only checks on U.S. banks, cashier's checks, or money orders will be accepted. Mail to: Foreign Agricultural Service, Room 4638-S, Information Division, U.S. Department Agriculture, Washington, DC, 20250-1000.

DESK REFERENCE GUIDE TO U.S. AGRICULTURAL TRADE (AH No. 683) is a practical and up-to-date reference source for those involved or interested in the international trade of U.S. food and agricultural products. It presents a comprehensive overview of the various aspects of U.S. agricultural trade from both an export and an import perspective. The publication is divided into three parts: U.S. agricultural exports, U.S. agricultural imports, and a statistical appendix. Copies of this report are available from the Foreign Agricultural Service, Room 5920-S, Information Division, U.S. Department of Agriculture, Washington, DC, 20250-1000.

The FOOD AND AGRICULTURAL EXPORT DIRECTORY is geared toward firms engaged in exporting and those who wish to enter the foreign market for U.S. agricultural products. It provides up-to-date listings and brief descriptions of Federal and State agencies, trade associations, and other organizations that offer advice and services in exporting all types of agricultural and food products. The directory is available from the Foreign Agricultural Service, Room 5920-S, Information Division, U.S. Department of Agriculture, Washington, DC, 20250-1000.

TRADE POLICIES AND MARKET OPPORTUNITIES FOR U.S. FARM EXPORTS, describes the agricultural economies and trade policies of 58 countries and the two trading blocs of the European Community and the six-nation Gulf Cooperation Council. It identifies government programs that aid agricultural exports or impede agricultural imports from the United States, and identifies market opportunities for U.S. agricultural exports.

APPENDIX VI. USDA'S COMPUTERIZED INFORMATION SERVICE

The U.S. Department of Agriculture offers a computerized information delivery (CID) service to speed much of its information to the public.

The CID service is designed for use by private news and information services that rewrite or otherwise enhance the information and sell it to their own clients. CID offers only current information, or news, at speeds up to 9600 baud and in bulk. Reports from many USDA agencies are available by computer anywhere in the country and throughout the world within minutes of their scheduled release times.

Reports from CID vary in length from a few sentences to 100 or more pages. CID offers hundreds of reports including press releases; crop, livestock, situation and outlook reports; trade leads; highlights of research data from USDA's 250 laboratories; soil and water conservation information; attache reports; analyses of commodity reports from Extension offices in various States; reports from fruit, vegetable, livestock, cotton, poultry, and other markets; boat and rail arrivals; a calendar of agricultural events; a daily 2-page summary of top news stories about USDA and agriculture in general; and this Fact Book.

The CID service also offers research information on human and animal nutrition, plants, soil, water, and new products.

CID provides five methods of capturing information: (1) Use of a dedicated line which allows the CID computer to send the user's computer what the user wants as soon as USDA releases it, (2) automatic retrieval through an order list developed by the user, (3) automatic retrieval by report title, (4) selected retrieval of releases on the user's list, and (5) selected retrieval by menu browsing.

The Commodity Futures Trading Commission and the U.S. Department of State also release reports through this system.

USDA's agencies loading into CID are the Agricultural Cooperative Service, Agricultural Marketing Service, Agricultural Research Service, Agricultural Stabilization and Conservation Service, Economic Research Service, Extension Service, Foreign Agricultural Service, National Agricultural Statistics Service (including its 44 State offices), Soil Conservation Service, Office of Public Affairs, and World Agricultural Outlook Board.

CID rates to the public are $75 monthly minimum, $12 per hour for connect time, and 95 cents for each 100 lines of information taken. The service is accessible by a local telephone call. For more information on USDA's computerized information delivery service, call (202) 447-5505 or write to the USDA Office of Public Affairs, Room 536-A, Washington, DC 20250.

APPENDIX VII. HOW TO GET INFORMATION FROM USDA

This list gives sources of information in the U.S. Department of Agriculture (USDA) and its various agencies. It also lists Freedom of Information Act offices. For additional copies of this list, call (202) 447-6623.

NOTE: Listings show title, room number, electronic communication identification number (in parentheses), and telephone number, in that order. If there is no electronic number, only the regular telephone number is shown. **Where no address is given, the address to use is either the same as the preceding listing's address in the same agency or: USDA, office name as listed, room number as given, Washington, DC 20250.**

OFFICE OF PUBLIC AFFAIRS

The mission of the Office of Public Affairs is to provide leadership, expertise, and counsel for the development of public affairs strategies vital to the overall formulation, awareness, and acceptance of U.S. Department of Agriculture programs and policies.

OPA serves as the principal USDA contact point for dissemination of consistent, timely information.

DIRECTOR OF PUBLIC AFFAIRS/PRESS SECRETARY, Room 201-A, (AGR101), (202) 447-4623; Washington, DC 20250-1300.

Deputy Director for Intergovernmental Affairs and Public Liaison, 536-A, (AGR102), (202) 447-6307 Deputy Director for Radio, News, and Publishing, 209-A, (AGR210), (202) 447-5654

OFFICE OF INTERGOVERNMENTAL AFFAIRS Director, 536-A, (AGR250), (202) 447-6643

Director of Native American Programs, 532-A, (AGR251), (202) 447-6643

OFFICE OF PUBLIC LIAISON Director, 102-A, (AGR220), (202) 447-2798

OFFICE OF PRESS & MEDIA RELATIONS Director, (202) 447-5050
Chief, News Division, 406-A, (AGR004), (202) 447-4026

USDA News, Emergency Programs, 460-A, (AGR210), (202) 447-5747
Chief, Radio & Television Division, 410-A, (AGR007), (202) 447-4330

OFFICE OF PUBLISHING & VISUAL COMMUNICATION Director, 402-A, (AGR230), (202) 447-8005

Yearbook Coordinator, 556-A, (AGR201), (202) 447-9173
Chief, Design Division, 516-A, (AGR018), (202) 447-4337
Chief, Photography Division, 4404-S, (AGR019), (202) 447-6633
Chief, Publishing Division, 542-A, (AGR017), (202) 447-6623

Publications Distribution, 507-A, (202) 447-7507

Pub./Distr./Congressional, 506-A, (202) 447-3365

USDA Information Center, 114-A, (AGR020), (202) 447-2791

Chief, Printing Division, 501-A, (AGR014), (202) 447-7509
Chief, Video & Teleconference Division, 1618-S, (AGR016), (202) 447-6072

INFORMATION TECHNOLOGY MANAGEMENT STAFF Head, 536-A, (AGR200), (202) 475-3939

ECONOMICS

ECONOMIC RESEARCH SERVICE-Conducts research in domestic and foreign agricultural economics. Analyzes factors affecting agriculture, farm productivity, financing, use of resources, and potentials of rural areas. Evaluates marketing potentials and development and marketing costs. Studies U.S. trade in agricultural products and role of agriculture in economic development of other nations. Reports situation and outlook, commodity projections, price spreads, and analyses of U.S. farm commodity programs.

NATIONAL AGRICULTURAL STATISTICS SERVICE-Prepares official USDA data and estimates of production, supply, prices, and other items necessary to maintain orderly agricultural operations through monthly, annual, and other periodic reports to the public.

Director, Information Division, Economics Management Staff, 228, 1301 New York Avenue, N.W., Washington, DC 20005-4789, (AGR078), (202) 219-0504

Freedom of Information Act Officer, 4310-S, (202) 447-7590

OFFICE OF ENERGY-Coordinates Department's energy policy, including all issues dealing with agricultural energy use and agricultural impacts of energy development and use; coordinates the energy activities of all USDA agencies and identities information resource personnel in other agencies. Public Information Contact, 144-E, (202) 447-2634 (See note on page 167 for address.)

Freedom of Information Act Officer, 4310-S, (202) 447-7590

WORLD AGRICULTURAL OUTLOOK BOARD-Coordinates the Department's supply and use commodity forecasts and agricultural situation and outlook analyses, including monthly U.S. and world supply and demand estimates. Leads departmental weather and climate and remote sensing activities; assesses impact of weather on agriculture. Coordinates annual Outlook Conference.

Public Affairs Officer & Outlook Conference Director, 5147-S, (AGR072), (202) 447-5447

Freedom of Information Act Officer, 4310-S, (202) 447-7590

FOOD AND CONSUMER SERVICES

FOOD AND NUTRITION SERVICE-Administers Federal food assistance programs including food stamps; food distribution; supplemental food for women, infants, and children; school lunch; school breakfast; special milk; child care; summer feeding, and other child nutrition and family food assistance programs.

Director, Office of Governmental Affairs and Public Information, 805 PC, 3101 Park Center Drive, Park Office Center Building, Alexandria, VA 22302, (AGR043), (703) 756-3039

Director of Public Information, 819 PC, (703) 756-3276

Freedom of Information Act Officer, 308 PC, (703) 756-3234

FNS REGIONAL PUBLIC AFFAIRS DIRECTORS

Northeast Region, Public Affairs Director, (AGR122), (617) 565-6395, 10 Causeway Street, Boston, MA 02222-1068 (CT, MA, ME, NH, NY, RI, VT)

Mid-Atlantic Region, Public Affairs Director, (AGR126), (609) 259-5091, Mercer Corporate Park, CN 02150, Trenton, NJ 08650 (DE, DC MD, NJ, PA, PR, VA, WV)

Southeast Region, Public Affairs Director, (AGR121), (404) 730-2588, 77 Forsyth St. SW, Suite 112, Atlanta, GA 30303 (AL, FL, GA, KY, MS, NC, SC, TN)

Midwest Region, Public Affairs Director, (AGR123), (312) 353-1044, 50 East Washington St., 4th Floor, Chicago, IL 60602 (IL, IN, MI, MN, OH, WI)

Mountain Plains Region, Public Affairs Director, (AGR125), (303) 844-0312, 1244 Speer Blvd. Rm. 903, Denver, CO 80204 (CO, IA, KS, MO, MT, NB, ND, SD, UT, WY)

Southwest Region, Public Affairs Director, (AGR124), (214) 767-0256, 1100 Commerce Street, Rm. 5-C-30, Dallas, TX 75242 (AR, LA, NM, OK, TX)

Western Region, Public Affairs Director, (AGR 127), (415) 705-1311, 550 Kearny Street, Room 400, San Francisco, CA 94108 (AK, AZ CA, HI, ID, NV, OR, WA, GU)

HUMAN NUTRITION INFORMATION SERVICE-Measures food consumption and dietary levels of the population; develops standard reference tables on the nutritive values of foods; and develops and cooperates with others in the development of materials to aid the public in meeting dietary needs, with emphasis on good nutrition, appropriate cost, palatability, safety, avoiding food waste, and conserving energy.

Director, Public Affairs Staff, Rm. 365, FB-PGP, Hyattsville, MD, 20782; (AGR042), (301) 436-8617

Freedom of Information Act Officer, Rm. 360, FB-PGP, (301) 436-7725

OFFICE OF THE CONSUMER ADVISOR-Coordinates USDA actions on problems and issues of importance to consumers. Represents the Department in policy discussions related to consumer issues before Congress, in meetings with other departments and agencies, and in various public forums.

Director, 207-W, (202) 447-3975 (See note on page 167 for address.)

INTERNATIONAL AFFAIRS AND COMMODITY PROGRAMS

AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS)-Administers commodity production adjustment and support programs; conservation cost-sharing with farmers and ranchers; the Conservation Reserve Program; natural disaster assistance to agricultural producers through payments and cost-sharing; and certain national emergency preparedness activities. Provides information services for Commodity Credit Corporation (CCC) and for ASC State and county committees.

Director, Information Division, 3702-S, (AGR025), (202) 447-5237 (See Note on page 167 for address.)

Freedom of Information Act Specialist, 3614A-S, (202) 447-5875

FOREIGN AGRICULTURAL SERVICE (FAS)-Serves as a basic source of information to U.S. agriculture on world crops, policies, and markets; administers agricultural import regulations; assists in the export of U.S. farm products; represents U.S. agriculture in foreign trade matters; administers USDA's responsibility for P.L.480 (Food for Peace), CCC export credit programs, and the reporting of export sales.

Director, Information Division, 5074-S, (AGR023), (202) 447-7115

Freedom of Information Act Officer, 4642-S, (AGR023), (202) 447-2375

OFFICE OF INTERNATIONAL COOPERATION AND DEVELOPMENT (OICD)-Coordinates USDA's international training and technical assistance programs. Sponsors international research projects and scientific and technical exchanges with other nations on topics of interest to U.S. farmers and agribusinesses. The agency's work includes development planning and analysis and efforts to encourage private agribusinesses to get involved in development work overseas. Serves as USDA's liaison with international food and agriculture organizations.

Director, External Affairs, 3125-S, (202) 245-5801

Freedom of Information Officer, 3125-S, (202) 245-5801

MARKETING AND INSPECTION SERVICES

AGRICULTURAL COOPERATIVE SERVICE-Provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. Works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

Director, Information Services Staff, 4207-S, (AGR050), (202) 245-5356 (See Note on page 167 for address.)

Freedom of Information Act Officer, 4022-S, (202) 245-5362

AGRICULTURAL MARKETING SERVICE-Provides for market news; develops quality grade standards and provides voluntary grading services for meat, poultry, eggs, dairy products, fruits and vegetables, cotton, tobacco, and livestock; administers marketing regulatory programs, marketing agreements and orders, and research and promotion orders; administers for Federal-State marketing improvement programs; wholesale facilities research programs; and purchasing foods for USDA food assistance programs. Conducts research activities and provides services relating to transportation of farm products and commodities, inputs, and equipment to help farm income and to expand exports, meeting the needs of rural America.

Director, Information Staff, 3510-S, (AGR051), (202) 447-8998 (See Note on page 167 for address.)

Freedom of Information Act Officer, 3510-S, (202) 447-6179

ANIMAL AND PLANT HEALTH INSPECTION SERVICE-Administers regulatory programs to control or eradicate animal and plant pests and diseases; for domestic and port-of-entry agricultural quarantine enforcement; for licensing and assuring the safety and effectiveness of veterinary biological products; for enforcement of the Animal Welfare and Horse Protection Acts; and for providing protection to livestock and crops from depredation by rodents, birds, and predatory animals.

Director for Legislative and Public Affairs, 1147-S, (AGR056), (202) 447-2511

Freedom of Information Act Coordinator, 600-Federal Building,
Hyattsville, MD 20782, (301) 436-5267

FEDERAL GRAIN INSPECTION SERVICE-Inspects and weighs grain and commodities; supervises official, private, and State grain inspection agencies and maintains U.S. grade standards for grain and grain products.

Confidential Assistant to Administrator, 1099-S, (AGR055), (202) 447-5091

Freedom of Information Act Officer, 0634-S, (202) 382-0237

FOOD SAFETY AND INSPECTION SERVICE (FSIS)-Administers Federal meat and poultry inspection program to assure safety, wholesomeness, and truthful labeling of these products. Conducts food safety consumer education program.

Director for Information & Legislative Affairs, 327-E, (AGR058), (202) 447-7943

Freedom of Information Act Officer, 3175-S, (202) 447-3002

FSIS REGIONAL INFORMATION OFFICES

Southeast Region, Information Officer, (AGR151), (404) 342-4967, 1718 Peachtree Street, N.W., Room 299-South, Atlanta, GA 30309

Southwest Region, Information Officer, (AGR152), (214) 767-1054, 1100 Commerce Street, Room 5F41, Dallas, TX 75242

North Central Region, Information Officer, (AGR153), (515) 284-6300 607 East Second Street, Des Moines, IA 50309

Northeast Region, Information Officer, (AGR154), (215) 597-3778, 1421 Cherry Street, Philadelphia, PA 19102

Western Region, Information Officer, (AGR155), (415) 273-6255, 620 Central Ave., Bldg. 2C, Alameda, CA 94501

PACKERS AND STOCKYARDS ADMINISTRATION-Enforces the Packers and Stockyards Act, an antitrust, fair trade practice, and payment protection law designed to assure free and open competition and prevent unfair and deceptive practices in the marketing of livestock, meat, and poultry.

Public Affairs Specialist, 3043-S, (AGR054), (202) 382-9528 (See Note on page 167 for address.)

Freedom of Information Act Officer, 3039-S, (202) 477-7063

NATURAL RESOURCES AND ENVIRONMENT

FOREST SERVICE (FS)-Administers program for applying sound conservation and utilization practices to natural resources for the national forests and national grasslands, for promoting these practices on all forest lands through cooperation with States and private landowners, and for carrying out extensive forest and range research.

Director, Public Affairs Office, 2nd Fl., Central Wing, Auditors
Building, 201 14th Street Southwest, Washington, DC 20250, (AGR061), (202) 447-3760

Freedom of Information Act Officer, 809-Rosslyn Plaza East, Rosslyn, VA, (703) 235-2523

FS REGIONAL INFORMATION OFFICES

USDA-Forest Service (Northern), (AGR136), (406) 329-3089, Information Officer, Federal Building, P.O. Box 7669, Missoula, MT 59807

USDA-Forest Service (Rocky Mountain), (AGR132), (303) 236-9660, Information Officer, 11177 West 8th Avenue, P.O. Box 25127, Lakewood, CO 80225

USDA-Forest Service (Southwestern), (AGR131), (505) 842-3290, Information Officer, 517 Gold Avenue, S.W., Albuquerque, NM 87102

USDA-Forest Service (Intermountain), (AGR137), (801) 625-5347, Information Officer, Federal Building, 324 25th Street, Ogden, UT 84401

USDA-Forest Service (Pacific Southwest), (GR134), (415) 705-2804, Information Officer, 630 Sansome Street, San Francisco, CA 94111

USDA-Forest Service (Pacific Northwest), (GR138), (503) 326-2971, Information Officer, 319 S.W. Pine Street, P.O. Box 3623, Portland, OR 97208

USDA-Forest Service (Southern), AGR133, (404) 347-4191, Information Officer, Suite 850, 1720 Peachtree Road, N.W., Atlanta, GA 30367

USDA-Forest Service (Eastern), AGR135, (414) 362-3640, Information Officer, Henry S. Reuss Federal Plaza, Room 500, 310 West Wisconsin Avenue, Milwaukee, WI 53203

USDA-Forest Service (Alaska), AGR139, (907) 586-8847, Federal Office Building, Information Officer, P.O. Box 21628, Juneau, AK 99802-1628

FS RESEARCH OFFICES

USDA-Forest Service (Intermountain Station), Research Information, (801) 625-5436, 324 25th Street, Ogden, UT 84401

USDA-Forest Service (North Central Station), Research Information, (612) 649-5276, 1992 Folwell Avenue, St. Paul, MN 55108

USDA-Forest Service (Northeastern Station), Research Information, (215) 975-4230, 100 Matsonford Road, 5 Radnor Corporate Center, Suite 200, Radnor, PA 19087

USDA-Forest Service (Pacific Northwest Station), Research Information, (503) 326-7134, P.O. Box 3890, Portland, OR 97208

USDA-Forest Service (Pacific Southwest Station), Research Information,

(415) 486-3615, 1960 Addison Street, Berkeley, CA 94704

USDA-Forest Service (Rocky Mountain Station), Research Information, (303) 498-1807, 240 W. Prospect Road, Fort Collins, CO 80526-2098

USDA-Forest Service (Southeastern Station), Publications and Information Services, (704) 257-4388, 200 Weaver Boulevard, P.O. Box 2680, Asheville, NC 28802

USDA-Forest Service (Southern Station), Information and Publication Services, (504) 589-6800, U.S. Postal Service Building, 701 Loyola Avenue, New Orleans, LA 70113

USDA-Forest Service (Forest Products Laboratory), Information, (608) 231-5237, One Gifford Pinchot Drive, Madison, WI 53705-2398

FS STATE AND PRIVATE FORESTRY AREA OFFICE*

USDA-Forest Service (Northeastern Area), DAG6313, Information, Planning, and Analysis Group, (215) 975-4104, 100 Matsonford Road, 5 Radnor Corporate Center, Suite 200, Radnor, PA 19087

*In other areas, contact the nearest FS Regional Information Office.

SOIL CONSERVATION SERVICE (SCS)-Carries out a national soil and water conservation program with cooperation of landowners and operators in local soil and water conservation districts and with other government agencies; administers the Department's Great Plains conservation program and watershed protection and flood prevention program; leads the national cooperative soil survey; has departmental leadership in assisting landowners and local groups in resource conservation and development projects.

Director, Public Information Division, Cotton Annex, Room 3, (AGR066), (202) 447-5240 (See Note on page 167 for address.)

Freedom of Information Act Officer, 6844-S, (202) 447-7730

SCS REGIONAL INFORMATION OFFICES

USDA-Soil Conservation Service (MWNTC), (402) 437-5346, 100 Centennial Mall North, Rm. 152, Lincoln, NE 68508-3866

USDA-Soil Conservation Service (NENTC), (215) 499-3979, 160 East 7th Street, Chester, PA 19013

USDA-Soil Conservation Service (SNTC), (817) 334-5485, South National Technical Center, Building 23, 501 Felix Street, P.O. Box 6567, Forth Worth, TX 76115

USDA-Soil Conservation Service (WNTC), (503) 423-6308, Federal Building, 511 N.W. Broadway, Room 248, Portland, OR 97209-3489

SCIENCE AND EDUCATION

AGRICULTURAL RESEARCH SERVICE (ARS)-Conducts research on production of animals and plants; protection of animals and plants from diseases; use and improvement of soil, water, and air resources; processing, storage, and safety of food; and human nutrition.

Director, Information Staff, 307-A, Building 005, BARC-W, Beltsville, MD 20705, (301) 344-2264; AGR081

Freedom of Information Act Officer, 331-B, same address as above, (301) 344-3928

ARS FIELD INFORMATION OFFICES

USDA-ARS, (309) 685-4011, (AGR114), 1815 North University Street, Peoria, IL 61604

USDA-ARS, (415) 559-6068, 800 Buchanan Street, Room 3012, Albany, CA 94710

COOPERATIVE STATE RESEARCH SERVICE-Administers certain Federal funds appropriated for agricultural and forestry research at State agricultural experiment stations, forestry schools, 1890 universities and Tuskegee University, and selected veterinary schools. Helps coordinate research and research planning on a regional and national basis. Conducts competitive and special research grants programs and maintains the Current Research Information System (CRIS) of State and Federal research records for publicly supported agricultural and forestry research.

Information Contact, (202) 401-4268, (AGS3003), 3328-B, 901 D Street, S.W., Aerospace Building, Washington, DC 20250

EXTENSION SERVICE-Links research, science, and technology to the needs of people, where they live and work, by providing practical education and information. Federal partner in the Cooperative Extension System networking 74 land-grant universities and local offices in more than 3,100 counties.

Director, Communication, Information, and Technology, 3328-S, (202) 447-3029, (AGS094) (See Note on page 167 for address.)

Freedom of Information Act Officer, 3328-S, (202) 447-3029, (AGS094)

NATIONAL AGRICULTURAL LIBRARY-Provides technical information on agricultural research and related subjects to scientists, educators, and farmers. Is coordinator and primary resource for national network of State land-grant and field libraries. Serves as U.S. center for international agriculture information. Public Affairs Specialist, (301) 344-3778, (AGS393), Room 204, NAL, Beltsville, MD 20705

For library services (reference, lending, etc.), (301) 344-3755, 1st Fl., same address as above

Freedom of Information Act Officer, (301) 344-3928, 331-B, B-005, BARC-W, Beltsville, MD 20705

SMALL COMMUNITY AND RURAL DEVELOPMENT

FARMERS HOME ADMINISTRATION-Provides loans to farmers who cannot obtain credit from banks or other lending institutions.

Makes loans for single family housing and multi-family housing in rural areas and to small communities to help them provide clean water, waste water treatment, health clinics, fire equipment, and other community facilities. Guarantees loans for businesses and industries in rural areas to help create jobs and maintain economic stability.

Director, Legislative Affairs & Public Information Staff, 5037-S, (202) 447-6903

Freedom of Information Act Officer, 6865-S, (202) 382-9638

FEDERAL CROP INSURANCE CORPORATION-Insures farmers against value of lost crop production due to natural disasters, such as hail, fire, and drought.

Director, Information & Governmental Affairs, 4416-S, (AGR032), (202) 447-3287 (See Note on page 167 for address.)

Freedom of Information Act Officer, 4608-S, (202) 447-4603

RURAL ELECTRIFICATION ADMINISTRATION-Makes and guarantees loans to rural electric and telephone systems to provide service at affordable cost. Makes zero-interest funding available to REA borrowers for rural economic development and job creation.

Director, Legislative & Public Affairs, 4043-S, (AGR033), (202) 382-1007

Freedom of Information Act Coordinator, 4043-S, (202) 382-1263

• • •

ADMINISTRATION

OFFICE OF ADVOCACY AND ENTERPRISE-Provides leadership, direction, and coordination for the Department's programs for civil rights, equal employment opportunity, small and disadvantaged business, minority research and teaching, and competition advocacy.

Public Information Contact, 1358-S, (202) 447-3680 (See Note on page 167 for address.)

Freedom of Information Act Officer, 1347-S, (202) 447-5681

OFFICE OF FINANCE AND MANAGEMENT-Provides direction, leadership and coordination of programs in finance, accounting, Federal assistance, occupational safety and health, productivity, management improvement, and administrative systems. It oversees the activities of the National Finance Center and fulfills the comptrollership function of the Working Capital Fund. It also provides budget, accounting, and fiscal services to the departmental staff offices and the Office of the Secretary.

Freedom of Information Act Officer, 117-W, (202) 382-1221

Vendor Payment Inquiries, 1-800-421-0323

OFFICE OF INFORMATION RESOURCES MANAGEMENT-Develops, recommends, and disseminates departmental information resources management principles, policies, standards, guidelines, and regulations; designs, develops, approves, implements, and reviews systems, processes, work methods, and techniques to improve the management of information resources and the operational effectiveness of USDA; and provides telecommunications and ADP services to USDA agencies and staff offices.

Freedom of Information Act Officer, 404-W, (202) 447-8657

OFFICE OF OPERATIONS-Provides overall general direction, leadership, and coordination of real and personal property, procurement, and mail functions and operates certain consolidated administrative activities in the Department.

Deputy Director & Public Information Contact, 113-W, (202) 447-3937
Freedom of Information Act Officer, 134-W, (202) 447-5008

OFFICE OF PERSONNEL-Provides leadership and coordination for the personnel management program of the Department and for evaluating the effectiveness of agency personnel programs.

Freedom of Information Act Officer, 16-W, (202) 447-3327

OFFICE OF THE SECRETARY

OFFICE OF AGRICULTURAL BIOTECHNOLOGY-Coordinates USDA programs and activities regarding biotechnology, including USDA review concerning environmental safety of proposed field tests involving genetically engineered organisms; supports the Agricultural Biotechnology Research Advisory Committee as well as the Biotechnology Council.

Public Affairs Specialist, 321-A, (AGS3034), (202) 447-4419 (See Note on page 167 for address.)

OFFICE OF BUDGET AND PROGRAM ANALYSIS-Provides direction and administration of the Department's budgetary functions; evaluates program and legislative proposals for program, budget, and related resources implications; analyzes program and resource issues and alternatives, and prepares summaries of pertinent data to aid departmental policy officials and agency program managers in the decisionmaking process; provides departmentwide coordination for and participation in the presentation of budget-related matters to the Committees of the Congress, the press, and interested public; provides departmentwide coordination of the preparation and processing of legislative programs and reports.

Congressional Documents (bills, public laws, etc.), 118-E, (202) 382-1525
Freedom of Information Act Officer, 147-E, (202) 382-1272

OFFICE OF THE GENERAL COUNSEL-Provides legal counsel and services to the Secretary and Department agencies.

Assistant General Counsel and Freedom of Information Act Officer, 2321-S, (202) 447-5565

OFFICE OF INSPECTOR GENERAL-Conducts and supervises audits and investigations relating to the Department's programs and operations; provides leadership and coordination and recommends policies for activities designed to prevent and detect fraud and abuse and to promote economy, efficiency, and effectiveness in departmental programs and operations; and keeps the Secretary and Congress fully informed of problems and deficiencies relating to the administration of departmental programs and operations and actions designed to correct such problems and deficiencies.

Chief, Policy Dev. and Information Branch, 13-E, (202) 447-5677
Freedom of Information Act Officer, 8-E, (202) 447-6915